THE MODEL ENGINEER

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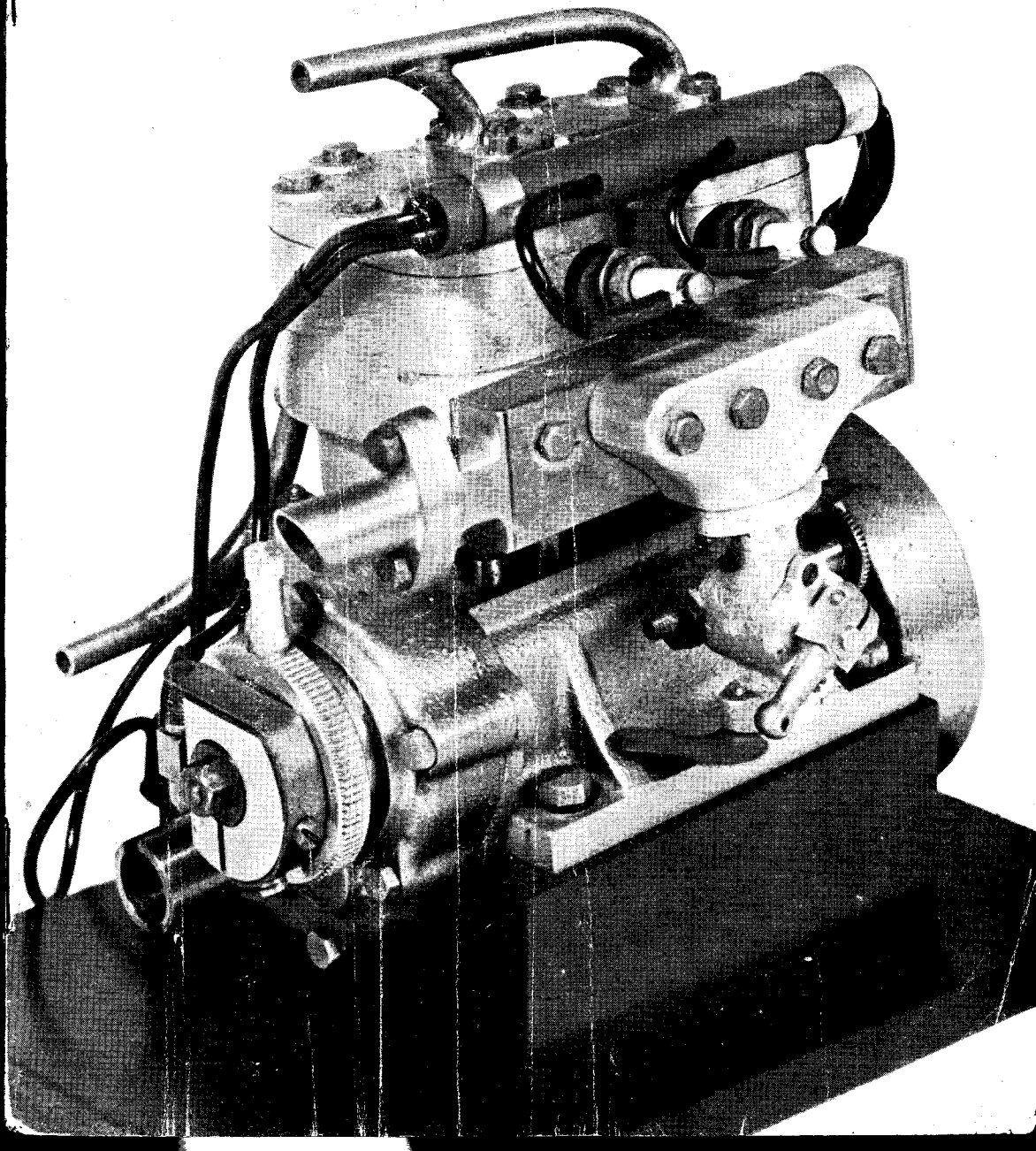

The MODEL ENGINEER

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SMOKE RINGS

Our Cover Picture

● THE DESIGN for the 10-c.c. "Seagull" petrol engine, now being described in the series of articles under "Petrol Engine Topics," has attracted a great deal of interest among readers in view of the possibilities which it offers for greater realism in the power plants of model prototype boats. Its appearance is characteristic of the type of engine which has been popular for many years in small harbour and river craft, and has been manufactured by several firms with one, two or more cylinders. Not less realistic is the quiet running and flexibility of control rendered possible with an engine of this type. This photograph shows the engine in its original experimental form, and the design has since been tidied up and improved in minor details.

A Prize for Model Traction Engines

● A GENEROUS-MINDED reader, who prefers to remain anonymous, recently earned £4 6s. 0d. as payment for an article recently published in THE MODEL ENGINEER. He promptly donated this amount to the "M.E." Exhibition Prize fund. Subject to the decision of the judges, it will be awarded to the best model traction engine in the Competition Section.

A Gala Day at Malden

● AUGUST 13TH is the date of a Locomotive Gala Day being organised by the Malden and District Society of Model Engineers, as announced in our "Clubs" columns.

The organisers thought that, in deciding upon this date, which is a Sunday, it would be welcomed by many model engineers who come to London for the "M.E." Exhibition and would like an opportunity of meeting fellow-modellers and of seeing a number of locomotives in steam on the society's continuous track. We hope there will be a good response to this open invitation, as we know that a hearty welcome awaits anybody who is able to take this opportunity.

A Splendid Veteran

● ARISING OUT of our recent note about the dismantling of two old beam engines in Glasgow, Mr. S. Bentley, power plant engineer to John H. Beaver Ltd., Bingley, Yorks, has sent us a most interesting letter. He is engaged on a survey of beam engines existing in Lancashire and Yorkshire, and he thinks that readers of the "M.E." might be surprised to learn that, in these two counties alone, there are some 70 to 80 beam engines, ranging from 100 to 2,000 h.p., still

running. Some will shortly be replaced by more modern, but not necessarily more efficient forms of power. As an actual instance, Mr. Bentley mentions one outstanding example with an expected long lease of life ; it is still developing regularly 1,000 h.p. on a coal consumption of 56 tons per week of 45 hours, and this is inclusive of steam required for heating purposes, etc. This engine was originally built in 1856 ! Evidently, it is a really hardy veteran, eternally young, and we would be interested to learn more about it, who built it and, especially, where it is to be seen.

Cranleigh Society's Exhibition

● MR. W. C. HALL, hon. secretary of the Cranleigh Model Engineering Society has sent us two items of welcome news which show that the society's activities are unabated. First, the third annual exhibition will be held on September 29th and 30th next, at the Cranleigh Village Hall. The centrepiece will again be the society's Gauge " 1 " layout which, although in a very unfinished state, operated continuously and very successfully last year. In the meantime, members have done much to improve the layout, and a start has been made on the provision of station buildings and other scenic effects. But a great deal has yet to be done before the layout is complete.

Secondly, the society has been fortunate in finding premises as headquarters ; they are situate at " Little Park Hatch Barn," Ewhurst Road, Cranleigh, and meetings are held there every second and fourth Saturday in the month, at 7.30 p.m.

A Difficulty at Chichester

● WE ARE sorry to learn that the Chichester and District Model Engineer's Society has met an unexpected difficulty regarding its new headquarters. A plot of land in the triangle formed by Pound Farm, Bognor and Florence Roads had been leased from the City Council, and here it was proposed to erect a club-house and workshops, and to lay down tracks for locomotives and race-cars. The local residents, however, have raised objections on the grounds that the noise which the models will create will constitute a public nuisance.

This is unfortunate, but, in the circumstances, there is little doubt that if the residents decided to apply for an injunction against the society, one would be granted, and that would be disastrous for the society. That is the law, and it must be respected.

On the other hand, we wonder if any of the residents concerned have ever been to a model car racing event, a model locomotive rally or a model power boat regatta ; and, if so, whether they are satisfied that the amount of noise created is really enough to constitute a public nuisance ? Do none of them use a motor-cycle, or a motor lawn-mower or even have the radio turned on full while all the windows in the house are open ?

Each of these three modern " amenities " can and does create what many people regard as an intolerable din, much more potent and irritating than the noise arising from any model engineering event ; yet little, if anything, is done about it. We would be among the first to agree that, in this noise-infested age, everything possible should be done to minimise noise as far as it is possible to do so, especially in cases where the noise, in addition to being an annoyance, is preventable. But we are very much inclined to the view that the particular Chichester residents concerned have called out before they are hit, and have quite overlooked the good influence of model engineering as a hobby and a spectacle.

As it is, the members of the society are now faced with the problem of finding an alternative site, and we hope very much that they will be successful. Negotiations with the City Council are in hand, and we know that everything possible will be done to bring the matter to an amicable conclusion.

Another Historic Beam Engine

● IT IS good news indeed that a rather remarkable beam engine which, for more than 100 years, was in continuous service at the Wychall Mill, Kings Norton, near Birmingham, is to be preserved ; the mill has been purchased by Messrs. Burman & Sons Ltd., of Edgbaston, for use as a new factory, and they have presented the engine to the Birmingham Museum.

The engine is something of a curiosity ; first, there is a strong local belief that it was built about 1780 by James Watt ; secondly, it is, in fact, two, a smaller one having been installed in the same pit and linked up with the main engine at a date unknown ; thirdly, it is claimed to be the only one in the world to be coupled with water power.

Mr. Stephen Burman is inclined to doubt the first of these claims and thinks that the engine is more likely to have been built by one of the many Midland engine builders who did contract work for James Watt, and we endorse this view as being much the more probable. What is indisputable, however, is that, fifty years ago, the Wychall Mill was casting and rolling silver billets for making spoons and cutlery. After the outbreak of war, in 1939, the mill was put to rolling out cartridge strip. The main point is, however, that this fine old engine is not to be scrapped ; in 1942, it was thoroughly overhauled and is in perfect working order, as it put in some months of good service before the mill closed in 1943. It has now been most carefully dismantled, not such an easy job in view of the fact that the main flywheel is some 15 ft. in diameter ; and we look forward eagerly to the time when, after it has been re-erected in the museum at Birmingham, we can go to pay it our respects and, perchance, obtain fuller particulars of it. Messrs. Burman & Sons Ltd. are to be warmly congratulated upon their public-spirited outlook and enterprise in adding one more priceless relic to the national collection. We wish that a great deal more of this kind of thing could be done, especially at the present time when anything old and historically valuable is inclined to be regarded with cynical derision rather than with respect and veneration. Relics like this one command admiration, not only for themselves but for the skill, foresight, ingenuity and industry of those who designed and built them for the good of the community.

WHAT TO SEE

AT THE 1950 "MODEL ENGINEER" EXHIBITION

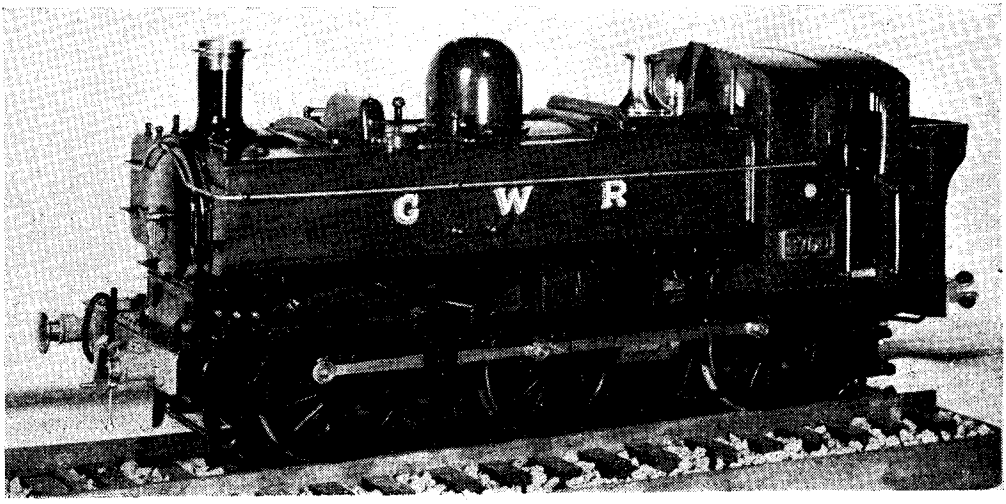
The Models

SINCE this article is being written some weeks prior to the opening of the "M.E." Exhibition, nothing like a critical survey of the various exhibits is possible; that will have to wait until we have been able to inspect the models at close quarters.

The locomotive, railway and land transport models do not appear to break any records, numerically, but they should be just as interesting as usual. From the entry-forms before us, we do not note any particular originality of design, except, possibly, in the case of Lt.-Col. L. Billinton's 1/6-scale replica of the 2-6-0 type "K" class express goods locomotive designed by him for the L.B. & S.C.R. nearly thirty years ago. This is the first instance we have come across of a former railway Chief Mechanical Engineer who has occupied himself, in his retirement by building a complete working model of one of his own engines. This exhibit will be of unusual interest for this reason alone; but the engine and tender have been built strictly in accordance with full-size practice, naturally, except for certain detail modifications which are essential in a working model. Col. Billinton has done the work himself, except producing steel and iron castings from his own patterns, flanging the boiler plates, forging some of the rods and purchasing certain small fittings. The engine and tender are 9 ft. 8½ in. long over buffers and, weigh about 11 cwt. empty. We feel that, in view of his somewhat advanced age, the builder has set a commendable example of enthusiasm and industry in undertaking a job of such magnitude and carrying it through to a successful conclusion.

A 2½-in. gauge L.M.S. 4-6-2 *Princess Royal* by Mr. C. G. East should attract attention, by reason of the fact that it is a "first attempt"; and, from its photograph, it seems to be a very good one, too, in spite of the fact that the builder is a tool-room foreman. The only parts purchased were the pressure-gauge and the castings for cylinders, wheels and hornblocks. The builder has had the satisfaction of seeing this engine haul three adults.

A 5-in. gauge G.W.R. "8750" class 0-6-0 pannier-tank engine by Mr. C. R. Jeffries is an example of a fairly heavy job done with only a modest workshop equipment; but it is very fully detailed, though certain departures from the prototype have been made to ensure satisfactory



A 5-in. gauge 0-6-0 pannier-tank locomotive by Mr. C. R. Jeffries

performance on the track. The model took less than two years to construct, and has already done a considerable amount of running.

Another intriguing entry is a 3½-in. gauge L.M.S. Class "5" 4-6-0 (*Doris*, as described by "L.B.S.C.") built by Mr. John Knighton, of Ilkeston. The only parts of this model that are not the competitor's own work are the pressure-gauge and the painting! That means a considerable amount of work other than that described by "L.B.S.C." has been put into this engine, either by patternmaking or fabrication.

Mr. S. T. Harris, of Cricklewood, is showing a freelance 2-6-4 tank locomotive for 5-in. gauge. This appears to be a fine piece of work by a retired engineer, and although it is obviously based on the L.M.S. engines of the same type, it is not a strict scale replica. The workmanship seems to be of a very high quality, and the engine has done a good deal of work at the Malden Society's track.

Another L.M.S. 2-6-4 tank locomotive, but for 3½-in. gauge, is being sent in by Mr. E. J. Morris, of Swansea. This, also, should attract considerable attention because it is, presumably, entirely the work of the competitor, no parts of any kind having been purchased.

A 3½-in. gauge L.N.E.R. 2-8-0-0-8-2 Garratt locomotive, by Mr. E. M. Thomas, of Ottery St. Mary, should be an impressive exhibit, since it is 5 ft. 7½ in. long and weighs about 160 lb. Its construction has occupied its builder's spare time for about 10 years and it is believed to be the largest and most powerful coal-fired locomotive yet built for the 3½-in. gauge. It has four piston-valve cylinders, 1¼ in. bore by 1⅝ in. stroke; the boiler was made by an "M.E." advertiser, but all fittings, except the pressure-gauge were made by Mr. Thomas, who also made every nut and bolt on the model, as well as all patterns for castings.

By way of contrast to the last mentioned, and coming all the way from Hawick, in Scotland, is a 5-in. gauge version of the ever-popular Stirling 8-ft. single-wheeler of the Great Northern Railway. It is the work of Mr. T. G. Horne, who has equipped the engine with modernised Stephenson link-motion and a light superheater, as well as following the advice of "L.B.S.C." regarding other details. It is fitted with an injector and an axle-driven pump, while the weight of engine and tender, empty, is 114 lb.

Mr. Fred Law, of Kingsbury, is responsible for the building of a 2½-in. gauge 2-6-0 locomotive, based chiefly on "L.B.S.C.'s" well-known "*Dyak*," complete with a running-in stand as described by Mr. W. M. Shellshear. This will certainly be an interesting novelty.

We now come to one of the "little wonders" of the exhibition. Mr. A. A. Sherwood, who is so well known for his "Dot" series of miniature marine steam plants and other ultra-small productions, has now entered the locomotive field with a "OO"-gauge, coal-fired, live-steamer! It is a 2-10-10-2 Mallet articulated compound carefully reduced to the scale of 0.183 in. to the foot from the Virginian Railway's (U.S.A.) *Big Boy* of 1918. This extraordinary little engine weighs about 2½ lb., has a length of 15 in. and is equipped with axle-driven feed-pump and force-feed lubrication, with a displacement oiler as a standby. All the motion work is made of stainless steel, and the bores of the cylinders are chromium-plated. We can imagine that this astonishing piece of work, which operates as a real compound, will be noted by potential visitors on their lists of things which must not be missed.

Mr. J. E. Jane, of Acton, is sending along his Gauge "1" *Juliet*, which was lately described and illustrated in these pages. This is a simple 0-4-0 side-tank engine, the main interest of which is that it was constructed entirely by hand out of all sorts of odds and ends of material, and without the aid of any kind of machinery.

Mr. A. Bielby, of Hull, who is a farm worker and has had no technical training, will be entering a 3½-in. gauge *Juliet* that appears to be one of the most outstanding examples yet built. Mr. Bielby possesses an assortment of files, a hand bench drill and a 2½-in. Portass lathe without any back gear! We have seen this *Juliet* in Hull and can testify to the excellence of the finish and the very unusual neatness of the general workmanship.

Another G.N.R. 8-ft. singlewheeler, this one for 3½-in. gauge, comes from Mr. F. W. Hebblethwaite, of Middlesbrough. It was built from drawings and castings obtained from H. P. Jackson, of York, and has had a number of details added after measurements had been taken from the prototype in York Museum. The painting and lining have been reproduced as nearly as possible to scale, and this, in the builder's own words, "needed my greatest effort." We can believe it!

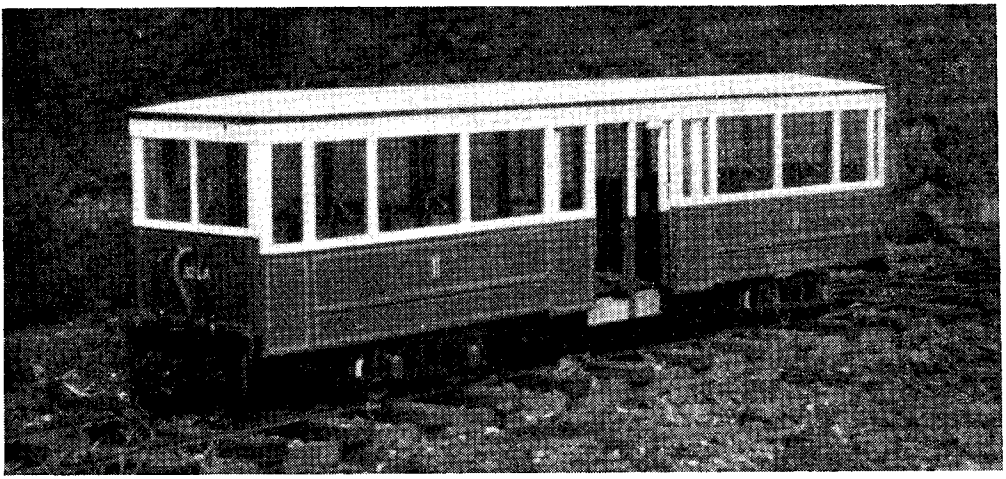
Mr. W. Jones, of Liverpool, enters a 0-6-0 dock-shunting locomotive which is based on the well-known Dick Simmonds *Ajax*, but embodies certain alterations to suit the ideas of the builder. For example, it has double oiling, so as to give an extra charge to the cylinders while running, and two separate blowers, one for raising steam when normal steam-raising facilities are not available. These are unusual ideas and we wonder if they give any decided advantages over normal practice.

What would seem to be something a little out-of-the-ordinary is coming from Mr. P. J. Dupen, of Goodmayes. It is a 0-4-0 contractors' saddle-tank type locomotive for 5-in. gauge, built from measurements and particulars taken from a Hudswell Clarke engine built in 1893 and used in the construction of the L.C.C. housing estate at Dagenham. The design was modified to suit the requirements of a working model, and although the grate is only 1⅞ in. by 1⅞ in., the engine works well.

Mr. J. W. Powell, who lives near Swindon, Wilts, and describes himself as a lone hand, is sending a 3½-in. gauge 0-2-2 *Rainhill*. Its construction has taken about six years, since the wheels were all cut from the solid, and all studs, bolts and nuts were home-made. The model has been polished, not painted, and its construction appears to have been carried out strictly in accordance with the "words and music" provided by "L.B.S.C."

Edward Allen, who is a garage mechanic at Reading, is showing a 2½-in. gauge G.W.R. "Bulldog" class 4-4-0 locomotive, on the

building of which he spent some 10 years. It has a proper tapered boiler-barrel, and all the fittings follow G.W.R. practice as far as possible, based on careful observation of the prototypes. All screws and nuts were home-made on a 4-in. Drummond round-bed lathe. The cylinders, which are $\frac{9}{16}$ in. by $\frac{3}{4}$ in., are inside, with the valves between them. This model should appeal especially to G.W.R. enthusiasts, among whom truck with back-rest, footboards and mileage indicator for 5-in. gauge. The drawbar is adjustable to suit the locomotive in use, and can be substituted by the hydraulic drawbar-pull indicator previously mentioned. The truck was built for the comfort and information of an owner-driver; the recorder reads 720 to the furlong and registers positively in each direction of running.



A $\frac{3}{4}$-in. scale Paris Tramways trailer car by Mr. H. J. P. Hudson

the "Bulldog," now so rarely seen, is usually a great favourite.

Mr. C. F. Toms, of Bristol, is exhibiting a *Juliet* which is his first attempt at model locomotive construction. It seems that although he found the making of the various parts comparatively easy, the assembly was "exceedingly difficult"; this may be due to lack of experience on his part.

Some indication of the gradual increase in practical interest in the construction of very small scale steam locomotives is further indicated by Mr. J. D. White, of Stroud, Glos, who is sending a 7-mm. scale steam-driven model of an old North London Railway 4-4-0 passenger tank engine. No castings were used; such items as wheels and eccentric-rods were cut from steel rod, and the assembly is, as nearly as possible, like that of the prototype, screws and bolts being used instead of soldering and brazing. The little engine has a proper locomotive-type boiler with steam dome. Incidentally, the builder is 64 years of age.

Among the "railway" accessories, there are two interesting items from Mr. K. N. Harris, of Wealdstone. The first is a hydraulic drawbar-pull indicator, the cylinder of which has a cross-sectional area of $\frac{1}{4}$ sq. in.; so 1 lb. pull indicates 4 lb. on the gauge. Needle-valves are provided to isolate either gauge and eliminate "flutter," and the whole device is used in place of the normal drawbar and hook on the driver's truck. The second item is a "crocodile" type of driving-

Traction Engines

Model traction engines appear to be scarce this year; only three have been entered for competition. First, there is a 1-in. scale "M.E." traction engine by Mr. A. Warnett, of Uxbridge, who states that it is his first attempt at a model of this kind; it should therefore appeal to other novices and beginners in the art of traction engine building. Secondly, Mr. I. N. Woollett, of Amersham, submits a 1-in. scale general-purpose traction engine, the construction of which was begun in 1945. It appears to be very well equipped for an engine of this size, since it is fitted with a mechanical lubricator, two-speed gear, differential, slip winding-drum, injector and mechanical feed-pump. It was designed by the builder, following Fowler's practice. Thirdly, a 2-in. scale Fowler traction engine by Mr. A. Jenkins, of Lapworth, should deserve close study, not only because of its size but also in view of the fact that the only purchased item on it is the pressure-gauge.

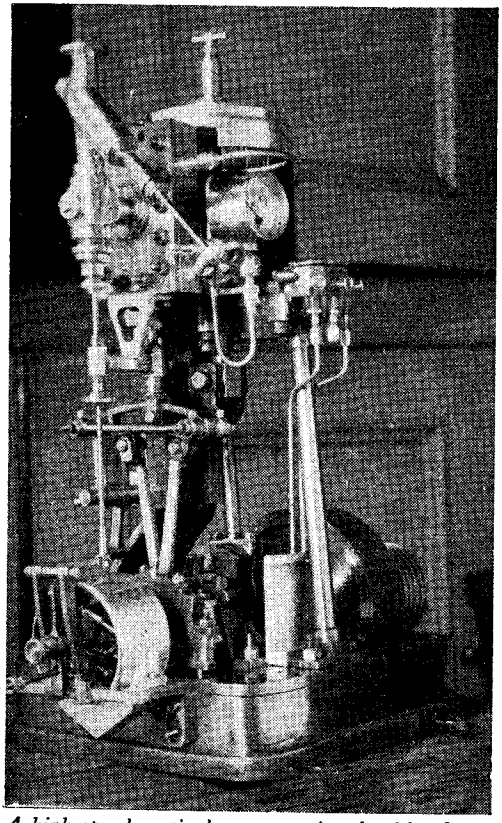
Tramway Models

Four members of the Tramway and Light Railway Society are each sending in a $\frac{3}{4}$-in. scale tramcar. The first is a Paris Tramways trailer car by Mr. H. J. P. Hudson, of Finsbury Park; the second, a free-lance car by Mr. R. Knowles, of Eltham; the third a Class E/3 London Transport car by Mr. R. Elliott, of Abbey Wood, and the fourth, a West Ham Corporation car by Mr. G. L. Mann, of Hockley.

Model Cars

This year, that well-known miniature motoring enthusiast and model engineer, Mr. C. W. Field, is treating us to one of his scale-type motor cars. Powered by a 10-c.c. engine of his own construction, the model is on the lines of a two-seater H.R.G. sports car, and is fitted with all the usual paraphernalia, including doors that open and a spare wheel correctly mounted at the back.

D. Harbison, a 16-year-old schoolboy, is xəhibiting a 4.5 c.c. powered "Special" with



A high-speed vertical steam engine, by Mr. S. H. Clarke, of Stockton-on-Tees

single-leaf spring front suspension and centrifugal clutch drive, the all-up weight of which is only $3\frac{3}{4}$ lb.

A 10 c.c. Ensign-engined free-lance car has been entered by Mr. Albert E. Haswell. The body is hand beaten from sheet aluminium and a speed of 85 m.p.h. was attained at the 1949 exhibition of the Coventry Society of Model Engineers.

An interesting and unusual deviation from usual practice is the truly miniature model, entered by Mr. John Mocogni, constructed of clear perspex and powered by an electric motor. Running r.t.p., this $6\frac{1}{2}$ in. long model is reputed to turn in a speed of 25 m.p.h., current being supplied from a 6-volt battery, connected to the motor by the tethering wires which operate from two slip-rings on the centre pole.

Another 10 c.c. model is the entry by Mr. Alfred Walshaw. This car is entirely home-made, the engine being constructed from sand-castings, and the design incorporates independent front suspension, silvered rear-view mirrors and bevel gear drive.

General Mechanical Models

The entries in this section are less numerous than have appeared in previous exhibitions, but there is still plenty of variety, including some very interesting examples of prototype steam engines, also experimental models of various types. Mr. Fred Smith, of Pinxton, Notts, who is well known as a fairly regular exhibitor, has entered a single-cylinder horizontal mill engine fitted with a Watt parallel motion, which has been built primarily for the purpose of keeping an actual record of a very interesting type of engine of which few examples are now in existence. Another mill engine is submitted by Mr. J. W. Ayres, of Stockton-on-Tees, in this case being a two-cylinder reversing horizontal engine based on a prototype engine of the Tees Conservancy Graving Dock. An interesting model of an Easton Amos Grasshopper beam engine is entered by Mr. H. J. Hawker, of Northampton. Vertical steam engines are represented by a Stuart No. 4 by Mr. H. L. Collett, of Nuneaton, a $\frac{5}{8}$ in. $\times$ $\frac{5}{8}$ in. single-cylinder engine by Mr. G. J. Dean, of Cambridge, and a single-cylinder high-speed vertical engine with reversing gear, governor, oil pump for internal lubrication and adjustable drip feed to the bearings and crosshead by Mr. S. H. Clark, of Stockton-on-Tees. Mr. T. W. Geary, of Chiswick, who is another regular exhibitor, has entered an experimental steam turbine and gearbox, and other experimental models include an opposed piston steam engine by Mr. P. J. Minto, of New Cross, and a four-cylinder hot-air engine of the flame injection type by Mr. R. J. Harrison, of Tunbridge Wells. A specially interesting exhibit in this section is the working model Rapier excavator by Mr. R. A. Rush, of Ipswich, which has taken over three years' spare time in construction, occupying 1,200 working hours. This model is built to a scale of 1 in. to 1 ft. internally and externally.

Internal Combustion Engines

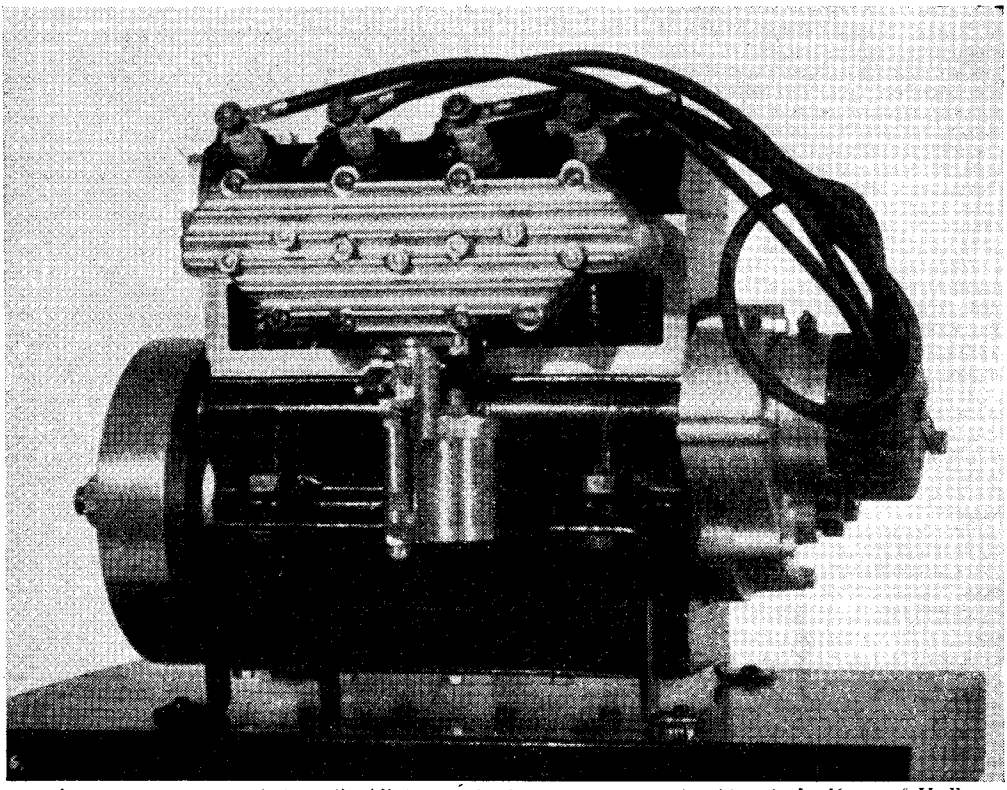
Several examples of engines built to "M.E." designs appear in this section, including an Ensign 10 c.c. engine by Mr. B. A. Lewis, of Beckenham, an Atom Minor Mark III by Mr. R. Sadd, of Chelsea, and a Seal four-cylinder engine by Mr. A. B. Langley, of Sheffield. An enlarged version of the same design working out at 120 c.c. has been produced by Mr. A. L. King, of Hull, who made all the patterns and castings for this engine. Experimental internal combustion engines are entered by Mr. C. H. Toogood, of Sudbury, Suffolk, and Mr. G. Morgan, of Port Talbot, Glamorgan, also an entirely original four-cylinder 10 c.c., two-stroke engine by Mr. F. Boler, of Leatherhead, who is well known as an exponent of model racing cars, and intends this engine to be fitted in a car in due course.

Tools and Workshop Equipment

Few entries for this section have arrived up to the time of going to press, but those which have been received appear to be of more than usual interest. Mr. S. H. Abigail, of Chiswick, has entered an interesting hand-tapping appliance for use on the bench or in the vice, to ensure that taps or dies are presented squarely to the work. An example of precision measuring instruments in this section include a model arch girder bridge for single railway track by S. V. Leleux, of Chilworth, Surrey, and a complete set of transmission gears in high tension steel for a 1½ in. scale model showman's compound traction engine by M. W. Herd, of Marlborough.

Scenic and Representational Models

Some of the models in this section are appro-



An 120 c.c. version of the "Seal" four-cylinder petrol engine, by Mr. A. L. King, of Hull

is the Vernier bevel protractor entered by Mr. W. Wood, of Cleckheaton, and Mr. F. Mason, of Bury, Lancs, has produced a sensitive drilling machine attachment to be used either in the lathe or larger drilling machine. A set of accessories for cutting clock wheels is entered by Mr. J. C. Stevens, of Ealing, W.5. It includes a dividing plate, drilling spindle, fly-cutter, frame, pulleys, and samples of wheels produced.

Scale Non-working Models

The entries in this section include examples of various types of road vehicles. Mr. A. J. Longstaffe, of Westcliff-on-Sea, has entered a collection of seventeen road vehicles constructed of wood and cardboard, all hand-painted. A model of the Ford "Prefect" chassis to a scale of 1 in. to 1 ft. is entered by Mr. G. B. Darling, of Cheam, Surrey, and a scale model 15-ton Scammel eight-wheeled lorry entered by Mr. W. A. Hanson, of London, S.E.1. Other entries priate to the furnishing of miniature model railways, while others have marine associations; an example which features both is the model of Inversnecky Pier station, a small terminus after the style of the late Highland Railway, in 2-mm. scale by Mr. R. W. G. Bryant, of Preston, Lancs. Urban architecture is featured in the models of Harrogate Valy Gardens and sun pavilion by Mr. A. Grunseid, of Harrogate, and a model of the parish church of West Ham, by Mr. H. E. Dear, of London, E.11, while the rural atmosphere is conveyed by the model by Mr. A. J. Robert of the main road through an old village. Mr. J. R. Brooks, of Sheffield, has entered a reconstructional model of Sheffield Manor House, based on drawings of Martin Davenport, the artist of the *Sheffield Telegraph*. A somewhat unusual model is that of a greenhouse, 2 in. high × 3 in. long by Mr. H. F. Burbage, of Sidcup, to be used as a lineside detail for an "O" gauge railway, and Mr. K. B. Rawlinson,

of London, S.E.9, has entered two solid scale model cars to a scale of $\frac{3}{4}$ in. to 1 ft. made in brass. Two models of Sussex windmills are entered by D. A. Dubbin, of Fulham, S.W.6.

Horological and Scientific Section

One of the best known exhibitors in this section in past exhibitions, Mr. C. B. Reeve, of Hastings, has again contributed an outstanding exhibit, namely a small weight-drive long-case clock with a perpetual calendar. Mr. Reeve's work hardly needs detailed description, but the photographs give some idea of both the external and internal workmanship of this exceptional exhibit. As usual, electric clocks are popular in this section, and include a synchronome free pendulum clock by Mr. G. R. Haupt, of North Harrow, and a $\frac{1}{2}$-second pendulum master clock on the "Hipp" contact system by Mr. J. H. V. Hayes, of North Cheam, Surrey.

Optical instruments are represented by a 35-mm. camera with accessories by Mr. S. Jennison, of Hull, and a film-strip and slide projector by Dr. C. Shields, of Chelsea. Mr. C. F. Toms, of Redland, Bristol, has entered an extensometer of the type for measuring axial deflection of a tensile or compression specimen while under test load.

General Craftsmanship

One of the most interesting exhibits in this section is a gypsy caravan built to a scale of approximately 1 in. to 1 ft. by Mr. F. J. Pateman, of Cambridge. This is fitted with opening roof and doors, and is completely furnished in the interior, including bunks, fireplace, chest of drawers, lamps and other accessories, everything, in fact, except the horse! Mr. P. Winton, of Wembley, who is well known for his models of period horse vehicles has entered a state postillion Landau to a scale of $1\frac{1}{2}$ in. to 1 ft. and from experience of his previous exhibits, this also should be of great interest. It is a correct scale model of the original one made by Messrs. Hooper for H.R.H. the Prince Regent of Iraq. A collection of builders' tools made to the scale of $\frac{1}{4}$ in. to the foot, is entered by Mr. J. W. Thomas, of Cardiff, and Mr. R. Johnston, of Glasgow, has produced two ornamental exhibits, a minature whisky cask and a lathe-turned hand-bell. A suit of armour copied from the original in the Wallace collection has been entered by Mr. W. F. Bayes, and two electrical models in this section are a switchboard by Mr. P. G. Chatham, of Kendal, Westmorland, and an electric motor for a small launch by Mr. F. Mason, of Bury, Lancs.

Junior Section

The models in this section are mostly of the representational or scenic type, and include a scale model of the Tufnell Park underground station by Mr. J. Silvester, of Wembley Park, a "OO" gauge model of the Newcastle-upon-Tyne high level bridge by Mr. W. A. Hawkins, of Teddington, a collection of micro-model locomotives in 2 mm. scale by Mr. C. T. Hyde, and miniature models of period fighter planes of 1918 Albatross, 1940 Spitfire and 1950 Meteor Jet, all of which can be placed on a penny, by Mr. K. J. Thompson, of London, E.10. A $\frac{3}{8}$ in., scale model of the Thames sailing barge *Kathleen*, framed and planked, with fitted cabin and lined hold, is entered by Michael Collins, of Northfleet, Kent, and a model hydroplane for a Jetex propulsion unit by Mr. C. T. Hyde, of Kendal, Westmorland.

Hydroplanes and Speed Boats

An example of the well-known "Hydrofin" hydrofoil boat has been entered by Mr. J. Wallace, of East Ham, E.6. This has been built from the designs of the patentee and inventor, to a length of 3 ft. 10 in., breadth of 1 ft. 7 in. An experimental hydroplane fitted with a 15 c.c. overhead-camshaft engine is entered by Mr. G. D. Reynolds of Farnborough. This is of original design throughout; the length is 33 in. by $12\frac{1}{2}$ in. maximum beam. Mr. T. W. Chapman, of Mitcham, Surrey, has entered a Vosper air-sea rescue launch to a scale of $\frac{1}{2}$ in. to 1 ft., which works out at 3 ft. length by 9 in. beam.

Ship Models

We are getting used to the idea of the ship model section being the largest and one of the most important in the Exhibition. From all appearances it is going to happen again this year, and so far as we can judge from the entry forms and our knowledge of the work of certain of the entrants, the quality is going to be as good as ever. The models are of all types and represent ships from early Egyptian times right up to the present day. The Rev. A. Everall, of Sheffield, whose work we have seen in previous exhibitions, has entered a model of an Egyptian sailing ship of the XVIII dynasty. The model has a hull length of 24 in. In the original, the yards were 65 and 60 yards long (lower and upper yards respectively), nearly equal to the length of the ship. By that time supplies of longer and better timber were coming from Syria making possible both longer ships and longer spars.

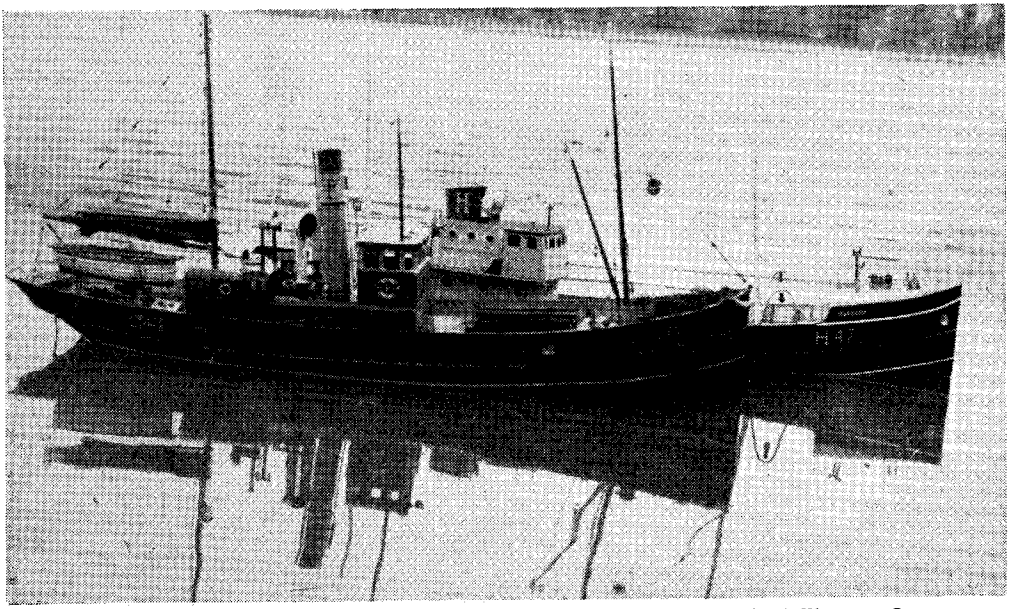
Mr. H. Hukin, of Southport, sends a model of a Viking ship of A.D. 900 to the scale of $\frac{1}{4}$ in. to 1 ft. This is clinker built of oak and should be an interesting model. He is also sending a clinker built model of a fisherman's dinghy to the scale of $\frac{3}{4}$ in. to 1 ft. and a $\frac{1}{2}$ in. scale model of a Morecambe Bay prawner *c.* 1910, and this again is a built-up model.

There are a number of models of Elizabethan ships, *Golden Hinds*, *Santa Marias*, *Marie Louise*, and the Lubeck galleon. Often these models are more decorative than ship-like, but occasionally one comes across a real gem which looks as if it really could sail, and we are always on the lookout. In the Restoration period we have an entry which we are very anxious to see—a model of H.M.S. *Prince* of 1670 by Rear Admiral Blackman, of Ashton, Hants. From the photograph it looks very impressive and from the entry form it is obvious that the builder has gone to the right sources for his information. We understand that it is the second of a series showing the development of the rigging of the sailing ship from ancient to modern times. The first was the *Elizabeth Jonas* with which the Admiral won the "Bacon" Cup in the 1934 Exhibition. If such

A 15 c.c. hydroplane, with o.h. camshaft engine, by Mr. G. W. Reynolds, of Farnborough

a series could be produced by one man it would probably be more valuable than one made by a number of different builders. The workmanship would be more or less the same in each model, and the approach to the subject, being consistent, would ensure a fairer comparison between each period. The entry from the Sheffield Ship Model Society for the Club Championship Cup consists of models of H.M.S. *Victory* by F. A. A. Pariser, the U.S. brig *Pilgrim* by C. J. Clarke, and a 10-gun brig of 1840 by A. E. James. This trio will merit very careful consideration. T. W. Karron, of Harrow Weald, sends a model of a naval dispatch schooner of the Nelson period. Mr. Karran's models are always worthy of notice. J. M. G. Gabriel, of Battle, Sussex, is sending a model of H.M.S. *Victory*, 28½ in. long which is about ⅛ in. scale.

There is quite a large number of models of the later sailing ships. An interesting entry is the sailing model of the clipper *Thermopylae* which forms the subject of the series of articles now running in *Model Ships and Power Boats*. This is a planked model built by Mr. Graham Henley, of Chelsea. Owing to extensive reconditioning of the sails and rigging which is in hand at the moment, only the hull will be shown at the Exhibition, but in view of the interest being taken in sailing square riggers, this model will attract a good deal of attention. Other notable sailing ships to be represented are the White Star *California*, *Queen Margaret*, *Granada*, *Loch*

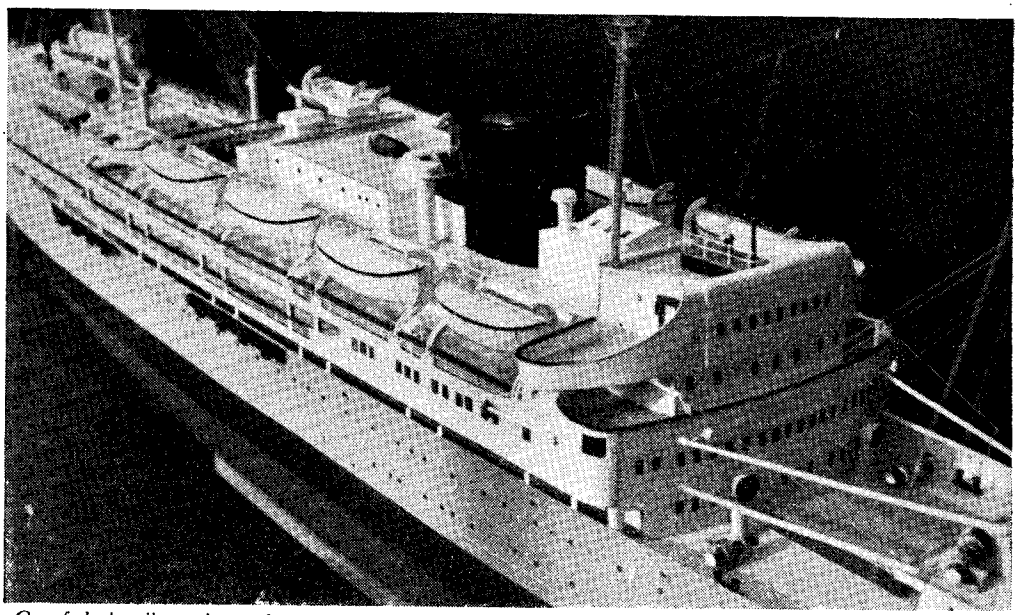


A very realistic working model steam drifter by Mr. H. G. Ross, of Wallington, Surrey

Sanart, at least three *Archibald Russells*, and a model of a two-mast topsail schooner from Lanarkshire. Models from Scotland are not very numerous, especially when one considers the number of keen modellers there are in Scotland, but presumably transport is a problem, especially for the larger ship models.

in the MODEL ENGINEER during the autumn of 1947. H. G. Ross, of Wallington, Surrey, has entered a 3 ft. model of the North Sea steam drifter. At the scale of $\frac{3}{8}$ in. to 1 ft. practically all the deck details should be shown.

Amongst the non-working models of steamships we have a model of the M.V. *Gartwood*, by



Careful detail work on Mr. R. Smales Andersen's 6 ft. working model of M.S. "Angola"—a Portuguese passenger liner

The naval ship models this year are mostly of the smaller types. Mr. A. Stroud, of Maidenhead, sends a model of the modern sloop *Black Swan* which appears to have a wealth of interesting detail. The 6 ft. working model of the destroyer *Javelin* by G. Miller, of West Drayton, Middlesex, is a very fine piece of work to judge from the photographs we have received. It was built from the series of articles which appeared in the MODEL ENGINEER during 1944.

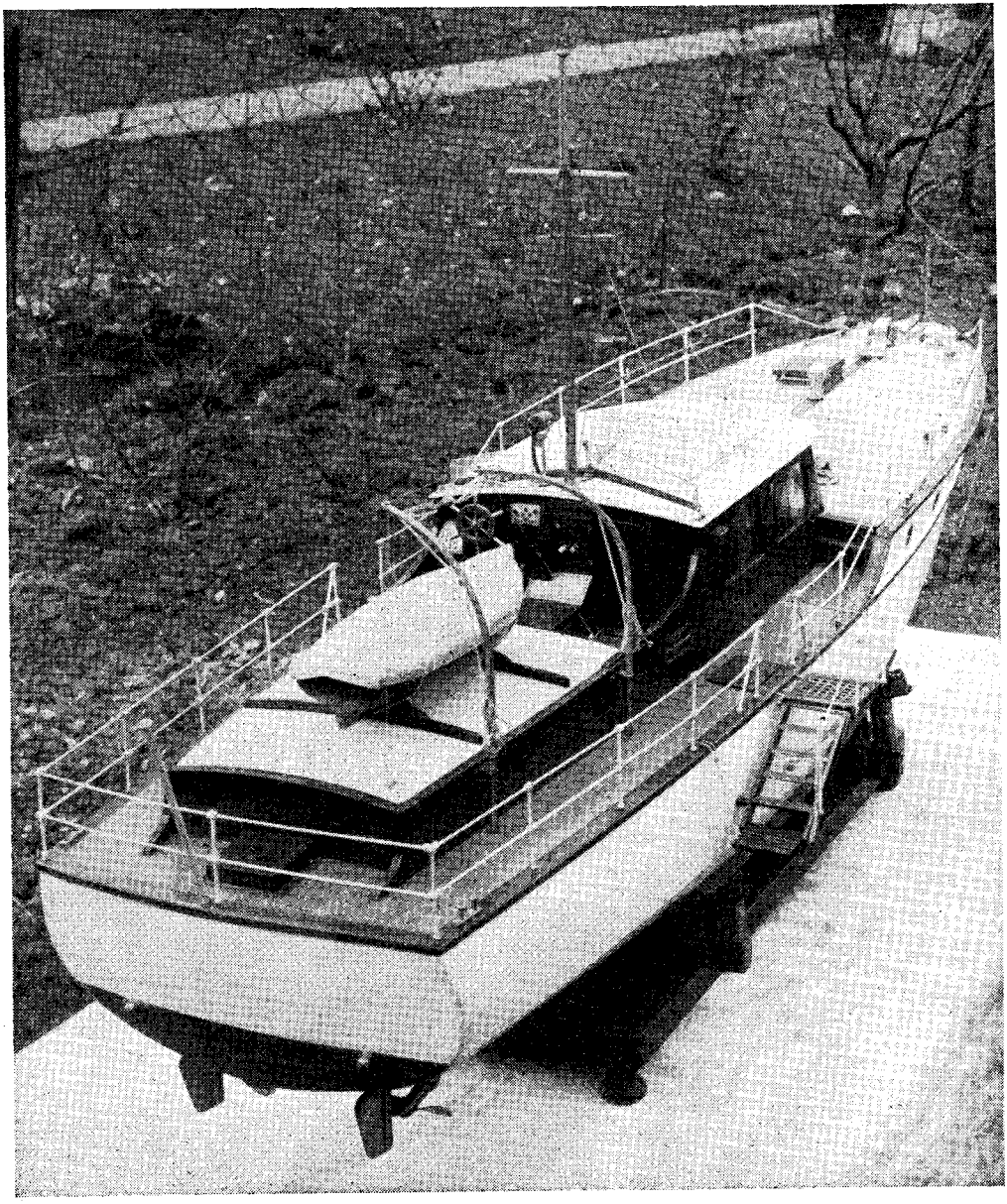
A number of working models of modern steam and motor vessels have been entered. That of M.S. *Angola* entered by R. Smales Anderson, a shipwright of Willington-on-Tyne would appear to be a notable one. It is to $\frac{1}{8}$ in. scale and is approximately 6 ft. in length. Mr. C. Knapp, of Leigh-on-Sea, sends a working model of a cargo motor vessel 55 in. long × 7 in. beam, and Mr. J. E. Gardner, of Teddington, a model of a deep sea trawler 38 in. long × 7 in. beam. J. E. Jane, of Acton, whose work we have seen in previous exhibitions, and who has written a number of articles on simple models, is sending a freelance model of a steam launch 34 in. long × 6 in. beam, which is propelled by a turbine. A number of modellers are working on turbines as power units for boats at the present time and we will be interested to see Mr. Jane's version. R. A. Davey, of Feltham, Middlesex, sends a model of the cargo liner *Penang* built to the instructions

E. N. Taylor of the Solent Ship Model Society. Mr. Taylor has also sent a model of the motor trawler *Milford Viscount* which went missing in the North Atlantic some little time ago, and a panel type case showing midship sections of ships' hulls of the last 50 years. Mr. Taylor's work is always outstanding and we look forward to seeing his latest models. Donald McNarry, of Barton, Hants, who has produced a number of wonderful miniature waterline ships models is sending a full-hull model of R.M.S. *Caronia* which will undoubtedly be a masterpiece in its class. We are pleased to see that Mrs. McNarry is entering a model this year—we missed her entry last year. This time it is a model of the P.S. *Great Western* of 1837, an unusual and a very interesting prototype. We can depend on Mrs. McNarry to make a worthy model of her choice. Mr. Thomas C. F. Stott, of Harpenden, Herts, sends a 40 in. model of R.M.S. *Queen Elizabeth*, and Mr. Dobree Carey, whose *Caronia* last year attracted considerable attention, is sending this year a full-hull model of R.M.S. *Himalaya*, to the scale of 1/32 in. to 1 ft.

An interesting entry is the model of the steam yacht *Iolaire* of 1900, with its clipper bow and fine lines, powered by a twin cylinder engine, which is entered by Dr. T. Fletcher, of Colne, Lancs. There are at least two models of A.S.R. launches—a Vosper type by T. W. Chapman, of

Mitcham, Surrey, and a Thornycroft type by George E. J. Weeks, of Cowes. Mr. E. N. Bays, of Sheffield, sends a couple of ½ in. scale working models of lifeboats—one of the Liverpool class and the other of the more recent cabin class. The second model is powered by a 0.75 c.c. diesel engine and has radio-controlled steering.

The miniature section provides some of the most fascinating models. Stuart E. Beck, whose name will be remembered by readers of *Ships and Ship Models*, sends a waterline model of the motor tug *Aboma* to the scale of 3/32 in. to 1 ft. The detail work in this model is very intriguing. Mr. D. S. Anthes, of the Sheffield Ship Model Society, sends a model of M.V. *Christenholm* shown hove-to in a West Indian hurricane. Mr. Anthes is a master in miniature work and his model will be worth careful exami-



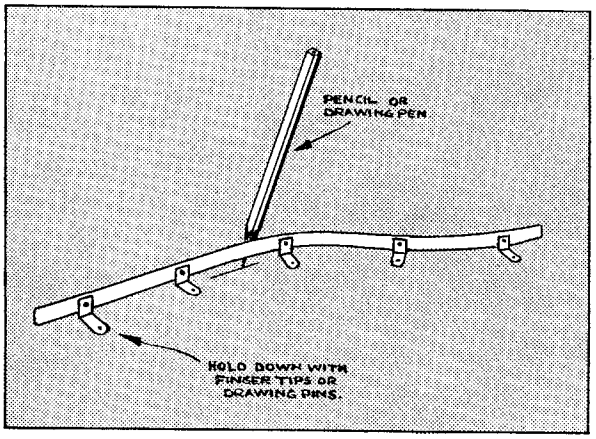
A fine working model of a Vosper motor yacht by Mr. A. S. Ablett, of Ruislip

nation. Another master of this craft is Keith P. Lewis, of Rock Ferry, Cheshire. Mr. Lewis's model this vear is of the Cross Channel Steamer *Arnhem.* In this model, even the chain for the anchors was made by hand as chain to this small scale (75 ft. to 1 in.) is unobtainable commercially. Mr. H. A. Kirby, of Mitcham, Surrey, has chosen an unusual prototype in his model of the Severn Trow, a type which traded down the Severn as far as Bridgwater, but is now quite extinct. Mr. Clifford Money, of Sheffield, can always be depended on to produce something unique and artistic. This time he is sending a model of the *Flying Dutchman* which we look forward to seeing.

It must not be imagined that the above includes all the models entered for competition. In fact, we have only been able to pick out a few at random. There are, of course, a number of model ships in bottles and quite a number in electric light bulbs, including one by C. Money of the Mississippi steamer *Robert E. Lee.* Several yachts have been entered, at least one Marblehead, and a number of 36 in. yachts. Half models were very popular at one time but are not often seen outside museums and naval architects' offices in these days. This year Mr. K. N. Harris has sent one which was made to try out the lines of a 50-50 motor sailer, half decked, which is to be built to dimensions 20 ft. × 6 ft. 8 in. × 2 ft. This type of model makes a very convenient wall decoration and the study of the lines is always fascinating.

Adjustable Curves for the Drawing Board

MOST model engineers at some time resort to the drawing board. Those whose special interest is either the construction of boats or aircraft will often find they have to draw curves which are not at any point a portion of a true circle. Unless one is the possessor of a set of "French Curves" or "Ships' Curves" the alternative may have to be freehand.



The little gadgets described will get over a lot of the difficulties.

The first is constructed from a length of discarded clock spring. Choose a spring which is not too thick and straighten a length of about 8 in. Provided this is not taken from the centre portion, it will be found that it can be straightened by pulling in reverse to the coil around a piece of round wood held in the vice.

To this are riveted five small pieces of brass which are bent at right-angles so that they may be held down on the drawing board with fingers and thumb. It may also be an advantage to drill a tiny hole in each of the angle-pieces so that they may, on occasion be pinned to the board with drawing pins. The holes in the spring can be punched, without drawing the temper, on a block of lead, using a small pin punch with a good square end, alternatively they may be drilled without much ill-effect on the drill, provided they are deeply centre punched so that the point of the centre punch breaks right through. After riveting, file the heads of the rivets nearly flush on the working side to avoid obstruction of the pen or pencil when in use.

It will be found that this little gadget will deal with curves which have a fairly quick change of direction.

Since constructing this curve, it has occurred to me that the ideal material, with just the right amount of temper, would be the springs used as an alternative to whalebone in ladies' corsets, but whether they are likely to be available in these "enlightened" days I wouldn't know and as I have no wish to be the cause of a domestic crisis, I leave it to the discretion of readers to approach their wives.

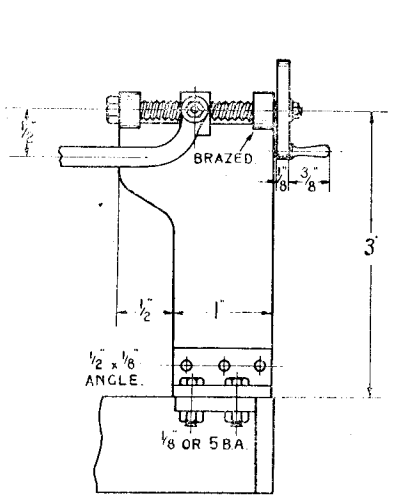
The second curve is ready made for us in the form of a short length of flat twin 3/.029 or similar T.R.S. electric cable which should be wiped with a petrol rag, as the surface is sometimes greasy and would mark the drawing. Afterwards, it may be rubbed with a little french chalk or talcum powder.

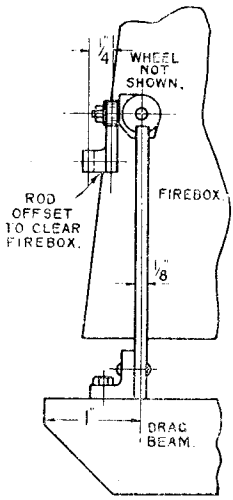
This curve will not be as pliable as the spring. but will cope very well with the more moderate curves, besides, to a certain extent, holding the shape to which it is bent, and provided its length is kept fairly short, may even be used as a template for transferring lines from the drawing to the work with a little care.—R.H.C.

Reverser for "Pamela"

by "L.B.S.C."

EITHER a wheel-and-screw, or a "pole" lever, can be used to reverse and notch up on *Pamela*, according to the wishes of the builder. Personally, I prefer the former; the only engine in the whole of my fleet, to have a pole lever, is the L.B. & S.C. Rly. engine *Grosvenor*, and she only has it because her big sister regular milling, could hold the bit of rod under the slide-rest tool-holder, at right-angles to the lathe bed, and traverse it across a home-made slot-drill, made from $\frac{1}{8}$-in. round silver-steel, same as I have described in previous notes. Anyway, chuck the rod, whether milled or not, in three-jaw; face the end, centre, drill down





Wheel-and-screw reverser for "Pamela"

sported one—"should auld acquaintance be forgot"—otherwise she would have had the screw reverser. I prefer it because it gives a finer adjustment of cut-off on my non-stop road; and being one of the nearly extinct race who believe in economical engine-driving, any aid to that end is welcomed. However, I don't deny the handiness of the pole lever for quick reversing on an up-and-down line, and I'd hate to do a night's shunting at Norwood or Herne Hill with a wheel-and-screw engine; so we'll consider both. Let's take the wheel-and-screw first.

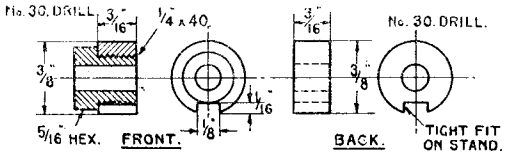
The stand for this may be cut from $\frac{1}{8}$-in. steel plate, or it may be a casting. If cut, you'll need a piece of $2\frac{7}{8}$ in. long and $1\frac{1}{2}$ in. wide, which is sawn and filed to the shape shown in the illustration. The foot may be made from a piece of $\frac{1}{2}$-in. $\times$ $\frac{1}{8}$-in. angle, riveted or brazed on, as desired; or the 1-in. section of the stand may be made $\frac{1}{2}$ in. longer, and bent to a right-angle, exactly as described for the stand for *Tich's* lever. The bearings for the screw are made from $\frac{3}{8}$-in. round rod, either bronze, gunmetal, or steel. I usually mill the slots for fitting to the top of the stand, in the round rod, before parting-off, same as you would mill a keyway. Beginners who have no milling machine, or any other substitute for about $\frac{1}{2}$ in. or so with No. 30 drill, and part off two $\frac{3}{16}$-in. slices, leaving them full width, so that they can be rechucked separately, and faced truly on both sides. Open out the second one with a 7/32-in. drill, tap it $\frac{1}{4}$ in. $\times$ 40, and make a bush to suit, from $\frac{5}{16}$-in. hexagon bronze or gunmetal. This is exactly the same as the hexagon-headed screwed glands described for gauge "1" engines, so I needn't repeat the ritual. Beginners could do the job with their eyes shut. File the nicks if not already cut, then put the plain bearing on the straight end of the stand, and the one with the bush, on the overhanging end, as shown in the illustration. Put a piece of $\frac{1}{8}$-in. rod through both, to make certain the holes are dead in line; then silver-solder them if bronze, or braze them if steel. Just anoint with wet flux, blow to dull red for silver-soldering, bright red for brazing, and touch the joints with either a strip of silver-solder, or soft brass wire, using the Cohen-Macpherson technique. Quench in water—not acid pickle for steel—and clean up. Take the bush out, after lining up the bearings, or it may get "stuck"!

Screw and Nut

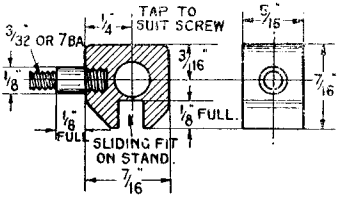
The screw is made from a piece of $\frac{3}{16}$-in. round steel rod. Chuck in three-jaw, face the end,

and screw it for about 1½ in. length with a $\frac{3}{16}$-in. Whitworth left-hand die in the tailstock holder. If you do not possess a left-hand die, it doesn't matter a bean, use right-hand ; the only reason I suggest left-hand, is that the great majority of locomotive reversers have left-hand threads, so that the nut goes forward when the wheel is turned clockwise. This is just the same as your slide-rest ; to advance the tool, you usually turn the handle of the cross-slide clockwise. of the jaws at each of the four quarters in turn, whilst filing the flats. The $\frac{1}{8}$-in. journals on the screw should be a nice running fit in the bearings on the stand.

A little block of gunmetal or bronze is needed for the nut ; a $\frac{5}{16}$-in. slice off a $\frac{7}{16}$-in. square rod will do nicely. At $\frac{3}{16}$ in. from top and one side, make a centre-pop ; chuck in four-jaw with the pop-mark running truly, drill 5/32 in. or No. 22, and tap to suit the screw. Exactly under



Bearings



Nut

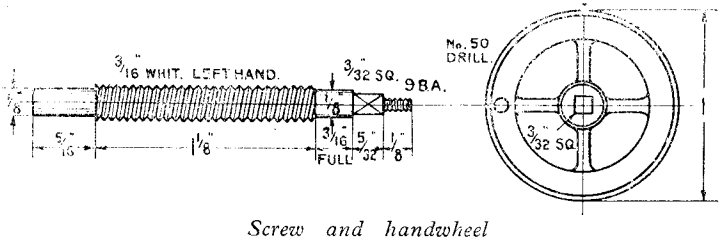
There are a few exceptions ; my baby Wolf-Jahn watchmakers' lathe has right-hand threads, and I have to use my noddle to save catastrophe when changing from one lathe to the other. I sometimes make small parts on my Boley, which has left-hand threads as usual, and finish on the Wolf-Jahn, if an exceptionally high speed is beneficial, as it sometimes is. The reversing screws on the Stroudley engines were right-handed, so when running chimney first, we notched up same way as turning the domestic wringer.

Use plenty of cutting oil, and aim for a nice clean thread ; then turn $\frac{5}{16}$ in. of the end, to a diameter of $\frac{1}{8}$ in. This ensures that you will have a full thread all along the screwed part. Some dies, especially when worn a little, form imperfect threads for the first two or three turns, which the above wheeze cuts away. Part off at a bare 2 in. from the end ; then reverse in chuck—it doesn't matter about holding the piece by the threaded part, as long as you don't screw the chuck jaws down too hard, though Inspector Meticulous would recommend holding the screw in a tapped bush, which is quite O.K. if you care to take the trouble to make one. Turn the end to $\frac{1}{8}$ in. diameter until you have just 1$\frac{1}{8}$ in. length of threaded part left ; then push the screw back in the chuck, until a full $\frac{3}{16}$ in. of the turned part is inside the jaws. Turn the end to 5/64 in. diameter, to within 5/32 in. of the chuck jaws, and screw 9 B.A. File the remaining 5/32 in. to 3/32 in. square, using a safe-edge file with the safe edge against the chuck jaws, and setting one

the tapped hole, file or mill a slot a full $\frac{1}{8}$ in. deep, wide enough to slide easily on the top edge of the stand. On the thicker side of the nut, opposite the tapped hole, drill a No. 40 hole, tap $\frac{1}{8}$ in. or 5 B.A., and fit a stud, as shown in the sectional illustration ; this is made from $\frac{1}{8}$-in. round steel, with the outer end turned down and screwed 3/32 in. or 7 B.A., for a nut to keep the reach-rod boss in place. The amount of "plain" projecting from the side of the nut, should be $\frac{1}{8}$ in. full. Bevel off the sides of the nut as shown, for the sake of appearance.

How to Assemble and Erect

Take the bush out of the front bearing ; poke the screw through the hole, squared end first, then put the nut in place on the stand between the bearings. Enter the thread in the nut, and



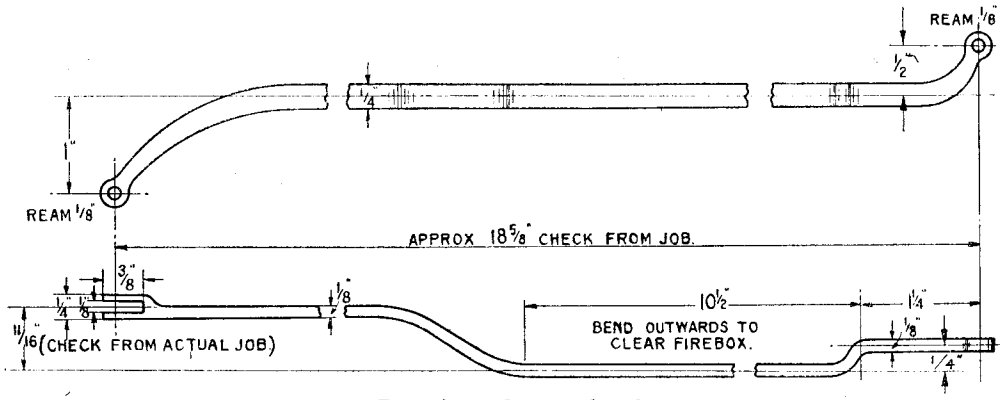
Screw and handwheel

screw it through until the journal at the squared end seats home in the back bearing ; then replace the bush. When this is screwed up tightly, the screw should be free to turn, without appreciable end-play, otherwise there will be a kettle-drum playing on the footplate, all the time the engine is running ! On a full-sized engine, a loose reverser will kick up such an infernal racket that you can't hear yourself speak. We used to carry a little wooden wedge to jam in the notches of a lever ; but old man Billy, who used to think of everything, provided a clamp on the nuts of the wheel-and-screw reversers, which was operated just like you tighten your lathe tailstock barrel, and gave the enginemen peace and quiet.

Our approved advertisers will be able to supply

cast handwheels ; the samples I have received in the past, for other engines, needed very little cleaning up. For a posh finish, the rim can be turned and polished, and looks fine if the casting is in nickel-bronze (German silver). An odd slice of dural rod makes a swell wheel ; *Tugboat Annie* and *Jeanie Deans* have dural reversing wheels. I just chucked the bit of 1-in. rod, turned the wheel on the end of it, drilled it 3/32 in. and parted-off. The hole was squared with a punch made from a bit of 3/32-in. square silver-steel, as described several times in these notes. Four holes were drilled in the web of the wheel, and an " Abrafile " plus a little judicious wangling, soon converted the metal between the holes, into spokes. Young Curly's first handwheel was a little gear-wheel out of a broken Jerry alarm clock, with all the teeth filed off, and a wire handle fixed in the rim ; and wasn't the poor kid proud of it ! Of course, it never did any notching-up, being merely connected to a sort of improvised four-way cock which changed over the steam and exhaust ports on a toy oscillating-cylinder engine ; but you had to turn it to reverse the engine, same as on a big one, and that was all that mattered to the fair-skinned golden-haired engineman whose age had not reached double figures. I'm not ashamed to confess that Curly's heart isn't a day older ; for example, I got just the same kick out of fixing up the automatic signals, that I got when I first rigged up remote control apparatus worked from the signals, for the little engine I built soon after starting work on the railway. Passenger hauling wasn't thought of in those days !

Turn the handle—wait a minute ; that sounds wrong, as we haven't made the handle yet ; you have to turn it before you can turn it, says Pat. Well, chuck a bit of $\frac{1}{8}$-in. round rod, steel or bronze, and turn it to the shape of the handle shown in the illustrations. That's more explicit, and now we know where we are. Drill a No. 50 hole in the rim of the wheel, turn the spigot of the handle to a tight fit in same, squeeze it in, and slightly rivet it over on the back of the wheel. The wheel should fit tightly on the squared end of the screw, and a commercial 9-B.A. nut and washer will secure it. If any of the screw projects through the nut, file it off flush, or it may cut the top of your finger. The whole bag of tricks is erected on top of the drag-beam by drilling two No. 30 holes through the foot, and the beam, and securing by $\frac{1}{8}$-in. or 5-B.A. bolts and nuts ; or you can tap the beam for set-screws, if you so desire. The centre-line of the stand should be 1 in. from the left side of the drag-beam.



Reversing-rod or reach-rod

Reversing-rod or Reach-rod

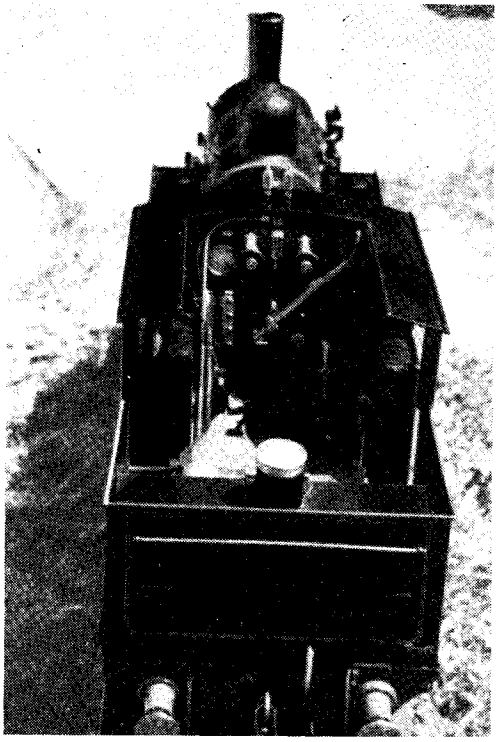
The rod connecting the nut on the screw, to the reversing-arm on the weighbar shaft is made from $\frac{1}{8}$ in. by $\frac{1}{4}$ in. steel rod, a piece about 19 in. long being needed. Both ends are tapered off slightly. The footplate end is a plain eye, rounded off and reamed $\frac{1}{8}$ in. as shown. The front end has a little block of steel brazed on to it, and formed into a fork, such as I have described " many a time and oft " as the old song says. Tip to inexperienced workers : take a piece of soft copper wire a little over 19 in. long, and bend it to the shape shown in the drawings, making a file nick on it, at each end, just where the holes come. If you straighten it out, it will give you the exact length to which you must cut the piece of rod for the job. Don't finish off and drill the eyes, until you have checked the rod on the actual engine. Put the nut in the middle of its travel, and set the valve-gear on the engine, with the die blocks right in the middle of the links. The distance between the centre of the pinhole in the reversing-arm, and the centre of the stud in the reversing nut, is the correct length of the reach-rod between centres, and you can go ahead and finish it off. A commercial nut and washer fixes the footplate end ; and a bolt, like those at the tops of the combination-levers, does the needful at the front end.

The rod will probably spring and whip when the reversing wheel is operated with the chassis in its present condition, but you don't have to worry about that. If you take a look at the general arrangement drawing, or the blueprint, if you have one, you'll see a bridle on the rod, just ahead of the firebox, and this will take care of any tendency on the part of the rod to spring. We can't fit it yet, as it is attached to the

running board ; so, all in good time, as the classics say.

" Pole " Lever

Those builders who prefer a lever instead of a wheel and screw, can easily make one up by following the full instructions given for *Tich*, but altering dimensions to suit the job in hand. Make the stand 2½ in. high, instead of 2 in., and lengthen the quadrant and sector plate by ¼ in. at each end. The hole for the fulcrum-pin is drilled the same distance from the bottom of the stand, viz. 5/16 in. Make the lever ½ in. longer at the bottom end, to match ; that is, 3½ in. from the top, to the fulcrum-pin hole. All the



Note regulator and water gauge

rest—trigger, latch, etc., will be made just the same as described for *Tich*. For erecting on the left-hand side of the engine, you can either turn the whole issue around the other way, which is easier, or you can erect the lever and sector-plate on the same side as the foot ; the centre-line of the lever stand should be 1 in. from the left-hand end of the drag-beam, as in the case of the wheel-and-screw stand, and the stand is attached in the same way.

The reach-rod pin should be fixed in the lever at a point where its total movement will be approximately 13/16 in. This position will be close underneath the sector-plate, and is easily found by trial and error, marking a spot on the lever and seeing how far it moves when the lever is shifted from end to end of the quadrant. As the connection to the lever is lower than that of the nut on the wheel-and-screw gear, the footplate end of the reach-rod will not need to be bent upwards, but slightly down. Its length between pinholes is ascertained in the manner already given, with lever and reversing-arm both in mid-travel. So much for the chassis essentials ; next stage will be valve-setting, and then the boiler.

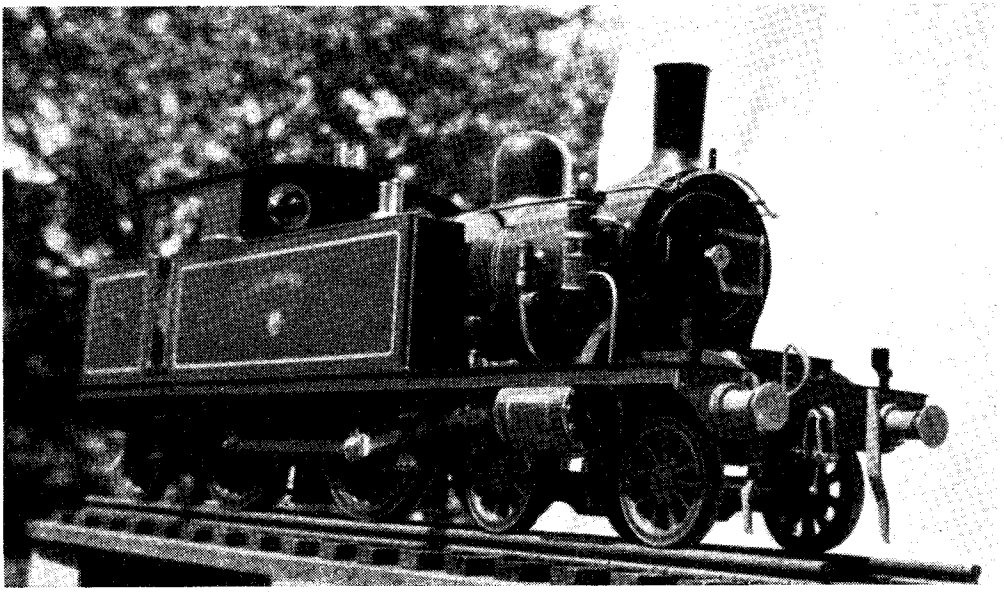
" Sisters in Exile "

Followers of these notes may recall a short note, with illustrations, on Mr. Nelson Burtt's *Petrolea*, a little Great Eastern locomotive operating at Sharon, Mass., U.S.A., some thousands of miles away from the home road. She now has a sister in exile, to wit, a London Tilbury and Southend engine, " born and raised " at Roslindale, Mass., not such a long way from her relation of the same gauge. I mentioned once or twice in these notes, that Mr. W. S. Van Brocklin was building this engine, and gave a picture of her under construction. She is now complete, and performs in the manner usually observed among well-bred locomotives. Our worthy friend is lucky in having a supply of good Welsh steam coal, and the engine does very well on it, running at a good speed on 20 per cent. cut-off, and will blow-off all the time, unless the pump is working, or the fire just made up. Bill Van B. says he had to learn the proper way to fire the narrow box, but once he got the hang of it, everything was O.K. Incidentally, Carl Purinton, whose engines *Little Red Hen* (2-6-0 *Princess Marina* type) and *Granny* (0-4-0 *Juliet* type) have narrow fireboxes, says he much prefers them to the wide firebox of the American engines.

Tilbury—Tilly for short !—is practically a " scale " job ; I happened to have a ¾-in. scale working drawing of the full-sized engine, which I posted across the big pond to Bro. Bill, who photostated it, and duly returned it. He has done a bit of modernising, same as I am fond of doing. In place of the full-size slide-valve cylinders, *Tilly* has a pair of piston-valve cylinders, 1 in. bore, 1⅛ in. stroke, with ½ in. piston valves, lubricated by a spring-plunger type of mechanical lubricator incorporating a bypass. The valve-gear is Stephenson link-motion, as on the original, with locomotive-type links of 4¼ in. radius. Driving wheels are 4⅞ in. diameter, leading and trailing 2½ in. diameter. The big and little ends of the connecting-rods have Heim " Unibal " bearings, and the driving axleboxes have Torrington needle bearings.

The boiler is very similar to that which I specified for *Juliet*, but has a deeper firebox, with a grate 2 in. wide and 3¾ in. long. Working pressure is 100 lb. relieved by two plain safety-valves. The boiler feed is by an eccentric-driven pump, ⅜ in. bore and ½ in. stroke, located in the middle of the motion plate ; an injector is also fitted. Boiler fittings and mountings include a tube-type throttle with pull-out handle, and a " window " water gauge. The smokebox is a casting. The capacity of the tanks (side and bunker) is half-a-gallon. The engine weighs approximately 50 lb. in working order.

Bill says he wasn't tackling any "watch-making," so the Westinghouse air pump is a dummy. The engine was painted with a Pasche air sprayer, and "Bill Senior" did the lining and lettering. The crests were provided by a friend Herb Robinson, of Celeron, N.Y., who had had them for 20 years! Our worthy friend apologises for the pictures, but says he is trying to get some good close-ups; so, if all is well, these will appear in due course, with details of performances.



The only one in the U.S.A.

Whose Fault Was It?

In the issue of June 8th last, I notice our old friend the "father of twins" specifically mentions your humble servant, and passes some observations on my locomotive designs, especially the *Princess Marina* built by his fair lady. Maybe I might be permitted in common fairness to say a few words in reply. It certainly *is* common knowledge that "L.B.S.C." engines do the job, *if built to the given instructions*; not only do it, but usually do a jolly sight more than ever I claimed for them, as hundreds of builders can testify. If the *Princess Marina* referred to by our friend failed to steam, then there was something amiss with either the blastpipe, blower, or both, plus the chance of the smokebox not being air-tight. There is also the possibility of the coal not being of suitable quality. British Railways have had numerous causes of failures due to inferior coal. There are plenty of other things which might cause the trouble mentioned by our friend; and with the best of intentions, might I give him a friendly dig in the ribs, and remind him that I know of a 5-in. gauge 4-6-0 which wasn't so hot, in several senses, when first time tried on the Malden line, although it was built by a friend who claims to have both the knowledge and experience. Criticism can be fair in both ways!

There is not the slightest need to "fiddle" with either blast or blower. If the engine doesn't steam satisfactorily at first kick-off, the symptoms will be such that anybody who possesses the average amount of "common" can put the matter right at one fell swoop. Regarding the single-jet blower, *Ayesha* had a ring blower when I first built her over 29 years ago; old readers may recollect that the holes in it were drilled with a drill-point stuck in a piece of rod, and operated down the chimney, to ensure the jets going up the liner. When she received her new boiler, after the old one (built in five evenings) had seen its best days, I never bothered to fit another ring, but used a single jet, which has given perfect satisfaction from that day to this, simply because it suits the diameter and length of the chimney. Followers of these notes don't need reminding of the various ring and combination nozzle blowers which I have specified in recent instructions; *Doris* and *Pamela*, for example. Wherever a ring blower has been needed, it has been introduced. There is no need for a ring blower on engines like *Dot* or *Diana*, and it would be waste of time to fit them.

So the firehole door fell off Mrs. A.-W.'s *Princess Marina*. That was a pity, but it is unfair to blame your humble servant for it, as I didn't make the screws that fixed it. They happened to be a poor grade of commercial metal; that is all there is to it. Some grades of "screw-rod" alloy will rot very quickly;

(*Continued on page* 182)

Novices' Corner

Using the Centre-Finder

THE method of using the centre-finder to centre a piece of work in the four-jaw chuck is illustrated in the photograph, Fig. 1.

Here the centre of the work has been marked-out and drilled with a centre drill. The coned end of the centre-finder is engaged in this centre by resetting the chuck jaws by eye, and, when the centre-finder has only a small amount of wobble, the final exact centring is made with the test indicator, applied in the manner illustrated in the photograph. It should be noted, however, that in the illustration the parts have purposely been

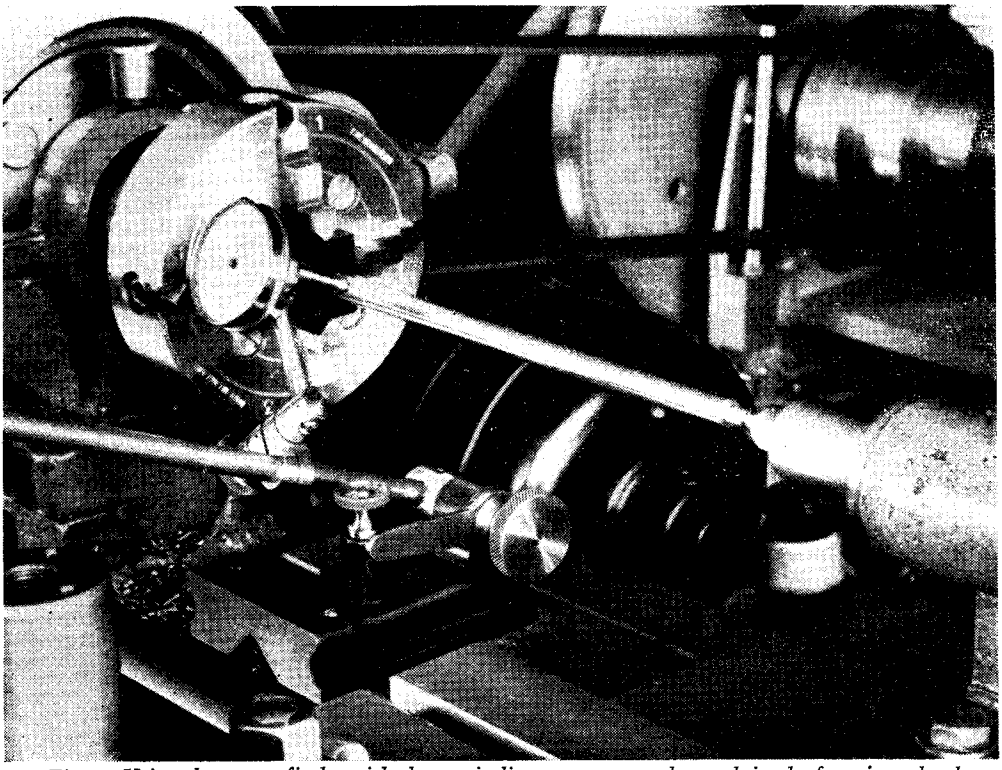


Fig. 1. Using the centre-finder with the test indicator to centre the work in the four-jaw chuck

mark and the tail end of the appliance is supported by the tailstock centre; the tailstock feed is employed to press the plunger inwards against its spring and thus ensure that the coned point is kept firmly in contact with the work.

When this setting has been made, the centre-finder should be free to revolve on its long axis, and on no account should the plunger be forced against the bottom of the bore in which it slides. Now turn the lathe mandrel slowly by hand, and, while the tail end of the appliance will, of course, remain truly centred against the tailstock centre, the end in contact with the work will travel on a circular path if the work is mounted out-of-centre. Any gross eccentricity should be corrected widely separated in order to form a clearer picture; in practice, the test indicator should be mounted with a minimum of overhang, and the base of the surface gauge employed should rest firmly on both shears of the lathe bed. In addition, the base register pins are pushed down so that they serve to locate the surface gauge against the front bed shear and keep the base from being pushed away from the work.

The point of the test indicator is brought into contact with the centre-finder at a point as close as possible to the workpiece without fouling the chuck jaws. If the mandrel is now rotated, the amount of eccentricity in the mounting of the work will be recorded on the dial of the test

indicator, and the chuck jaws are then adjusted to set the centre-finder to run truly by employing the method described in a previous article for centring work in the four-jaw chuck.

When machining eccentric parts, the drilled centre may have to be set to run out-of-centre by an exact amount ; this setting can readily be made by adjusting the chuck jaws until the test indicator in contact with the centre-finder records

The plug is now parted off and reversed in the four-jaw chuck so that, when the flanged portion is set to run truly, an accurate centre can be drilled with a centre drill.

Fitting an Adapter to the Centre-finder

Another way of centring large holes, when using the centre-finder, is to fit an adapter, of the form shown in Fig. 4, to the pointed end of the

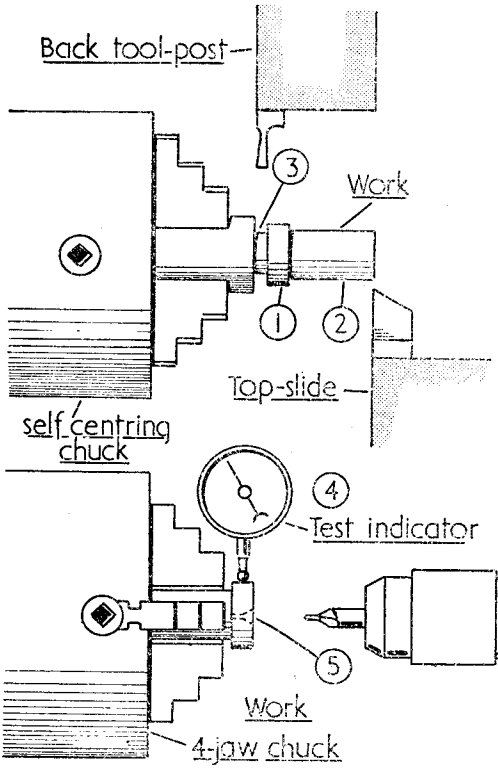


Fig. 3. Showing the method of machining the centred plug

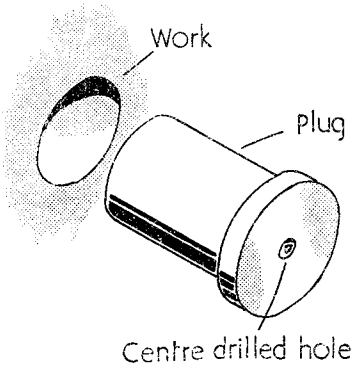


Fig. 2. A centred plug fitted to a large bore to accommodate the centre-finder

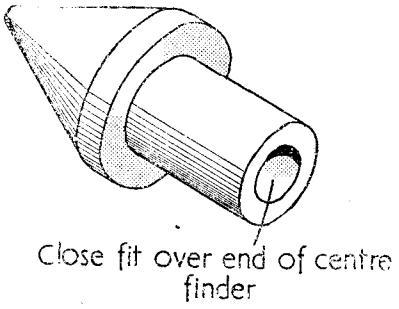


Fig. 4. A form of adapter for fitting to the centre-finder

an excursion equal to twice the eccentricity required.

Centring Large Holes with the Centre-finder

Although a small drill hole formed in the work can be centred in the same way as a centre-drilled hole, a large hole or bore will not allow the point of the centre-finder to seat in the work. To overcome this difficulty, a flanged plug bearing a drilled centre may, as shown in Fig. 2, be fitted to the bore to provide a seating for the tip of the wobbler.

To make this fitting, a length of rod is gripped in the chuck, as shown in Fig. 3, and the end is turned to form a close push fit in the work-piece. The outer diameter of the flange is also turned in order to make it concentric with the end portion.

appliance. This adapter may, of course, be made of large size so that it can be used with a wide range of work, moreover, a single adapter is all that is required, whereas a centre plug will serve for one size of bore only.

For accurate working, the adapter should be machined so that, when fitted in place, it is truly concentric with the end of the centre-finder. The machining operations are therefore carried out in the manner illustrated in Fig. 5. As an adapter with a nose of 1 in. diameter will be large enough for most purposes, a piece of round bar of this size is gripped in the chuck and the end portion is faced and turned parallel. The bore is drilled in the usual way about 1/32 in. less in diameter than the finished size ; a small boring tool is then employed to machine the bore to a close push fit on the end of the centre-finder. To ensure that the conical tip is turned concentric

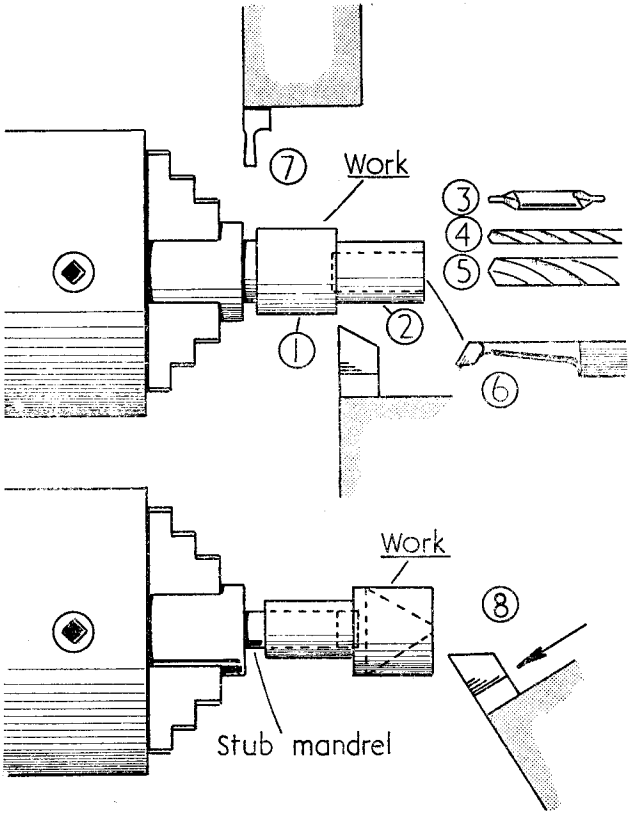


Fig. 5. Machining the adapter and forming the conical point

with the bore already formed, the adapter is mounted on a stub mandrel for completing the machining. This mandrel is made by reducing the diameter of a piece of rod gripped in the chuck, until the adapter can be pushed on for some little distance and then firmly secured by being lightly tapped farther on to the mandrel.

The making of stub mandrels of various kinds and the methods of adapting them for different purposes will be described in a future article for the benefit of those who are not familiar with these useful fittings. When the adapter has been secured to the mandrel, the coned point is turned to an included angle of 60 deg.; this angle is chosen, as it is similar to that formed by the ordinary centre drill and, in addition, it corresponds with the angle of the lathe centres.

The machining is carried out as when turning the point of the centre-finder itself, by setting over the lathe top slide and taking a succession of light cuts with a knife-tool. Where an accurate coned point is required, the machining should always be done in this way and not by using the broad cutting edge of an ordinary lathe tool set an at angle. As the adapter is actually intended for making contact with large holes, there is, again, no need to form the tip to a sharp point.

As the adapter will, perhaps, be used for centring large pieces of work, it will be advisable to case-harden this part when made of mild-steel; silver-steel will, however, be found resistant to ordinary wear, and this property will be enhanced if the steel is hardened by first heating to a bright cherry red and then quenching in oil.

"L.B.S.C."

(*Continued from page 179*)

others are quite O.K. However, there is not the slightest need to turn screws out of rustless steel, for the purpose of fixing firehole door hinges. If I am doubtful about the screws I have in stock I simply turn up my own, from the odds and ends of bronze rod which accumulate; and I have never yet had one of these home-made screws fail. I use rustless steel screws for certain jobs, but the only reason for that, is because a friend in the trade gave me a big boxful of "rejects"; these were commercially made for aero and similar work, and would not pass the close tolerances called for in the specification. They are plenty good enough for locomotive-building and similar work, where half-a-thousandth either way on the length or diameter, makes not the slightest difference.

Now, Bro. Hyphen, let me whisper in your ear. I was tickled to death by your remarks in the first column on page 838 of the issue mentioned; and I fancy I can solve that problem for you. You say Mrs. Hyphen made some more engine parts, then left them strewed all over your favourite bench, and only came into the workshop to collect tea cups *and remind you of jobs in the house left undone.* That's just it—maybe if you'd have done the jobs, she would have got on with the engine. Boy, you said it—experience *has* a way of instructing us! A nod is as good as a wink to a blind horse; nuff' sed.

The Wicksteed Regatta

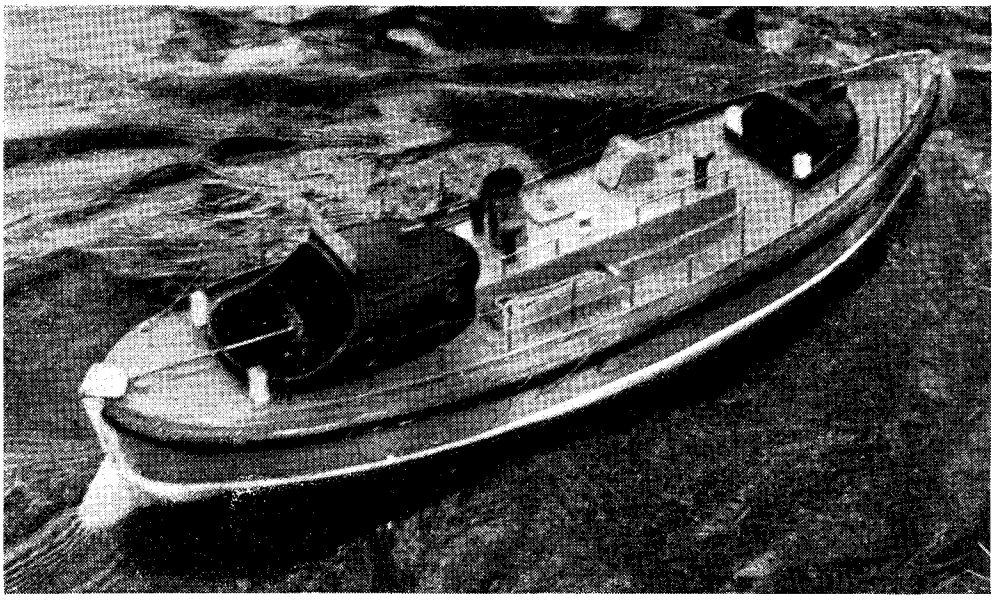
Mr. Churcher (Coventry) with his 15-c.c. boat, "Annette II"

THE power boat section of the Wicksteed Model Yacht and Power Boat Club consists of only a few members, but this fact does not prevent an annual regatta being held for power-driven boats. This year's effort was, as usual, a great success, and the Wicksteed club are to be congratulated for providing a very pleasant day's sport.

The regatta was supported by several London clubs, besides most of the Midland ones. Bedford sent quite a team of steering boats. Bournville and Altrincham were well represented, while other competitors hailed from the Coventry, Kings Lynn, Orpington, Enfield, Derby and Blackheath clubs.

The most important events of the day were the races for the Newman Lowke and Timpson trophies. Both are for the "A" class hydroplanes, and many well-known power boat exponents have held these trophies in the past.

The race for the Timpson Trophy was first on the programme, the distance 500 yd. and this was contested by three competitors. One of these represented the home club, H. Robinson, with *Chic*. This boat took part in many regattas in pre-war times and once put up a record for



An unusual prototype model, Mr. G. H. Green's motor lifeboat. (Bedford)

i.c.-engined boats. This time it was out of luck ; stalling on the first run, *Chic* broke the tethering bridle due to rather a poor getaway on the second run. On hitting the bank the hull sustained severe damage which prevented any further racing. K. Williams, with *Faro*, made two runs, both around 35 m.p.h., while W. Meageen (Altrincham) was also running much below par with *Samuel* ; the best of this boat's two runs was 29.2 m.p.h.

The winner of the Timpson Trophy for this year was thus :—K. G. Williams (Bournville), *Faro*, 35.76 m.p.h.

The lunch interval came next, and many competitors and friends availed themselves of the excellent facilities provided at Wicksteed. Upon their return, racing was resumed with the 1,000 yd. race for the Newman Lowke Cup.

This event did not take very long to decide as there were now only two contestants. A thrill was provided, however, when *Faro* fairly romped round the course at over 49 m.p.h. for the distance ! This more than made up for *Faro's* rather slow speed in the previous race. This performance is to be claimed as a M.P.B.A. record for 1,000 yd. W. Meageen could do no better in this race than before with *Samuel* so the official result was :—K. G. Williams (Bournville), *Faro*, 49.4 m.p.h.

It was a great pity that more 30-c.c. boats were not present to take part in these two events, but perhaps more will manage it next year.

A steering competition followed, and some ten boats took part, five of which came from the Bedford club. One of these, K. Brownridge's *Wye*, scored eight points, and this could not be improved upon by any of the other competitors ; in fact, only five boats managed to record a score ! This was due to the very long course, which provided quite a severe test of a boat's capabilities.

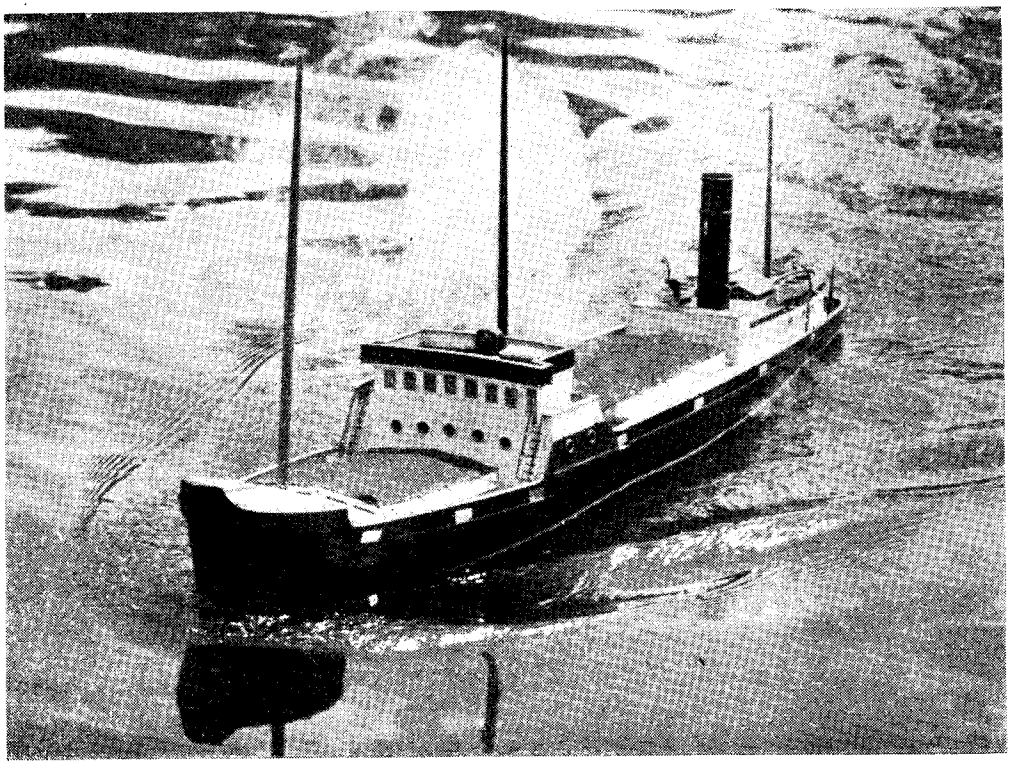
The runner-up was Mr. Gray (Coventry), *CU9*, with six points.

A 300 yd. race for 10-c.c. hydroplanes attracted quite a number of entries, but no very sensational speeds were recorded. H. Wraith (Altrincham), recorded 34.86 m.p.h., E. Clare (Derby), 32.2 m.p.h. The youngest competitor, C. Stanworth (Bournville), did still better with *Meteor IV*, recording 40.9 m.p.h.

This latter performance had not been bettered after all boats had used up all their attempts. Several boats capsized or stalled on both runs, and thus were unable to return a time for the three laps necessary.

The official winner and holder of the Douglas Cup for this year :—C. Stanworth (Bournville), *Meteor IV*, 40.9 m.p.h.

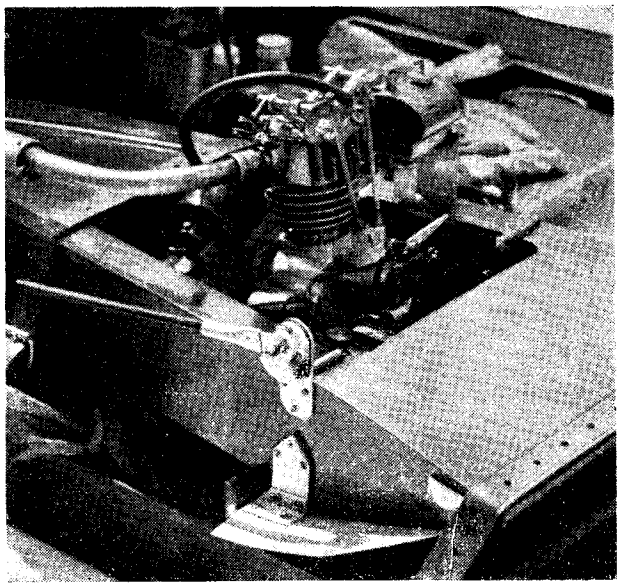
The final race of the day was a 500 yd. race for the Paten Cup, for 15-c.c. boats, which saw four contestants do battle.



Mr. H. Penny's model cargo steamer. (Bedford)

T. Dalziel (Bournville) with *Naiad II* was unlucky when upon the first run a coupling pin sheared just after releasing the boat. G. Lines (Orpington) came next with *Sparky II*, and this craft fully upheld its reputation with a fine run— 57.4 m.p.h. !

The other competitors in the race, Messrs. Churcher (Coventry) and Stalham (Kings Lynn), were well behind this speed, *Annette* recording 36.2 m.p.h. and *Tha II* 37.8 m.p.h. On the second round *Sparky* made another faultless run, this time slightly slower, 55.5 m.p.h. W. Churcher's *Annette* improved on the previous speed slightly while *Tha II* did not complete the course.



The 15-c.c. engine of Mr. B. Stalham's "Tha II" (Kings Lynn)

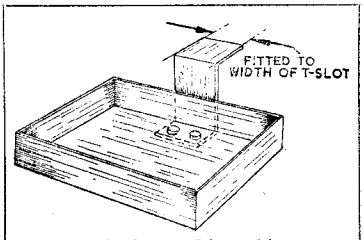
Winner of Paten Cup for this year :— G. Lines (Orpington), *Sparky*, 57.4 m.p.h.

This finished the racing for the day, but competitors and friends retired to tea in the refreshment pavilion, where the various trophies and cups were presented to the winners, this bringing to a close a most enjoyable day.

Keeping the Lathe Clean

by A. Macdiarmid

THE following tips may be useful to others in overcoming swarf trouble. My lathe is an M.L.7 and one of my first jobs after delivery was to fit chip trays to the cross slide. The trays are attached by arms which slide into the T-slots in the cross slide and are therefore immediately detachable for emptying at frequent intervals during working periods.



Method of attaching chip trays

The next question was how to deal with the chips which missed the trays and landed on the lathe itself, and here I found that a 1½-in. paint brush gave a satisfactory answer. By detaching a chip tray and using it as a small dust pan I can give the lathe a brush over in a few seconds, sufficient to remove all visible traces of swarf. The brush size of 1½ in. is also just about right for sweeping out the hollow between the slides of the lathe bed, and chips lying there are brushed along to the tailstock end and into the " dust pan." The brush has been in use for many months, and it seems quite unaffected by contact with lubricating or cutting oil, and, unlike a cloth, swarf has no tendency to cling to it. When not in use the brush hangs by a loop on a thumb-screw for the cover of the lathe gear wheels, where it is always at hand.

The hollow headstock mandrel also collected its quota of chips. At first I closed it with a wood plug but found this inconvenient to remove when the hollow properties of the mandrel were required, so a form of pull-through was evolved. This consists of a small round brush, like a miniature flue-brush attached to a single strand of electric lighting flex. The flex is stiff enough to be easily pushed through the mandrel and then the brush is pulled through towards the chuck end. The small brush is also useful for cleaning chucks, the leadscrew thread, T-slots, etc.

*Miniature Slide and Strip Projectors

by "Kinemette"

THE subject of illumination for this projector has already been briefly referred to, but the details of fittings for this purpose have been left until last, as they are subject to wide variation to suit individual requirements or convenience. It is, of course, practicable to use the same lamps as recommended for the single-frame projector, with equal efficiency, but as there is more room in the lamphouse, and better ventilation, this allows of a much wider choice of illuminant, and it is also possible to use higher power lamps.

In the sectional view of the projector, on page 826 of the June 8th issue, lamp fittings of similar type to those specified for the other projector, though of more robust dimensions, are shown, and these are recommended to the constructor who wishes to obtain the greatest possible adaptability in respect of both illuminants and optical components. Details of these fittings are given herewith, and it will be seen that the horizontal rods which carry the lamp fittings are in this case screwed into a square bar which is attached by three screws to the inside of the front lamphouse plate. In other respects, the fittings call for no special comment and present no constructional problems.

The Pre-focussed Lamp

Several readers have asked whether it is possible to use pre-focussed projection lamps in this projector, as most of the commercially-made filmstrip projectors use lamps of this type, and they are obtainable from well-known lamp manufacturers in various voltages and wattages. Certainly it is possible to use them, but the precise method of fitting will depend on individual requirements. A pre-focussed lamp is simply one which is designed to be used in a fixed holder, the position of which has been determined in relation to the optical system so that no adjustment is necessary. So long as no alterations are made to the optical system (i.e., in the focal length of the objective or condenser), and that no extreme variations in the throw distance of the projector are likely, such a lamp will always be in focus, and will give something approaching to maximum illuminating efficiency.

It would be quite practicable to mount a pre-focussed lamp holder directly on the floor of the projector, adjusting its position so that the lamp filament is exactly on the centre line of the optical system, both vertically and horizontally, and the correct distance from the back of the condenser to produce clear and even illumination of the screen when the objective is correctly focussed. This may call for the use of packing under the holder to adjust the height ; the lamp must also be positioned about its vertical axis so that the filaments are presented at the most efficient angle, to make the best use of the illumination.

An Alternative Holder

As an alternative, a suitable holder for the lamp may be employed in connection with the fittings illustrated, so that it is not used as a pre-focussed lamp but is capable of universal adjustment. This, of course, would make it adaptable to any changes in the optical system, and also interchangeable with other types of lamps which may be tried, by changing the actual lampholder fitting. The only snag here is that standard holders for pre-focussed lamps are generally very bulky, and unsuitable for mounting on an adjustable carrier in this way ; it is, however, possible to make a special holder to take the lamp socket, which will remove this limitation.

Many special projector lamps are designed to work directly from 110-V mains, and in such cases either a suitably wound transformer, or a resistance, may be used when working from the 220-250 V mains. The space available in the base of the projector will accommodate either component quite adequately ; voltage adjustment may be provided by a range of tappings, or in the case of the resistance, a sliding adjustment is practicable. It is quite a good policy to make such adjustments accessible only from under the base, so that they are not visible to attract meddling fingers. How many of us have found, only too late, that somebody has shifted the resistance knob so that 250 volts have been applied to an expensive 110-volt projection lamp !

It should always be remembered that lamps designed specially for projection invariably cost a good deal more than those which have been recommended for adaptation to projection purposes. The constructor who is not overburdened with wealth (and who is, nowadays ?) may be prepared to tolerate a comparatively modest standard of illumination on economical grounds. Most projection lamps cost a guinea or more, compared with a motor car headlamp bulb at about 2s. 6d., and are much more fragile.

The possibility of using lamps obtained from the war surplus market, such as those designed for use in signal lamps or miniature searchlights, is also worth consideration, but no definite information can be given on this subject, as the specifications of such lamps vary widely and supplies are where you find them.

Heat Screens

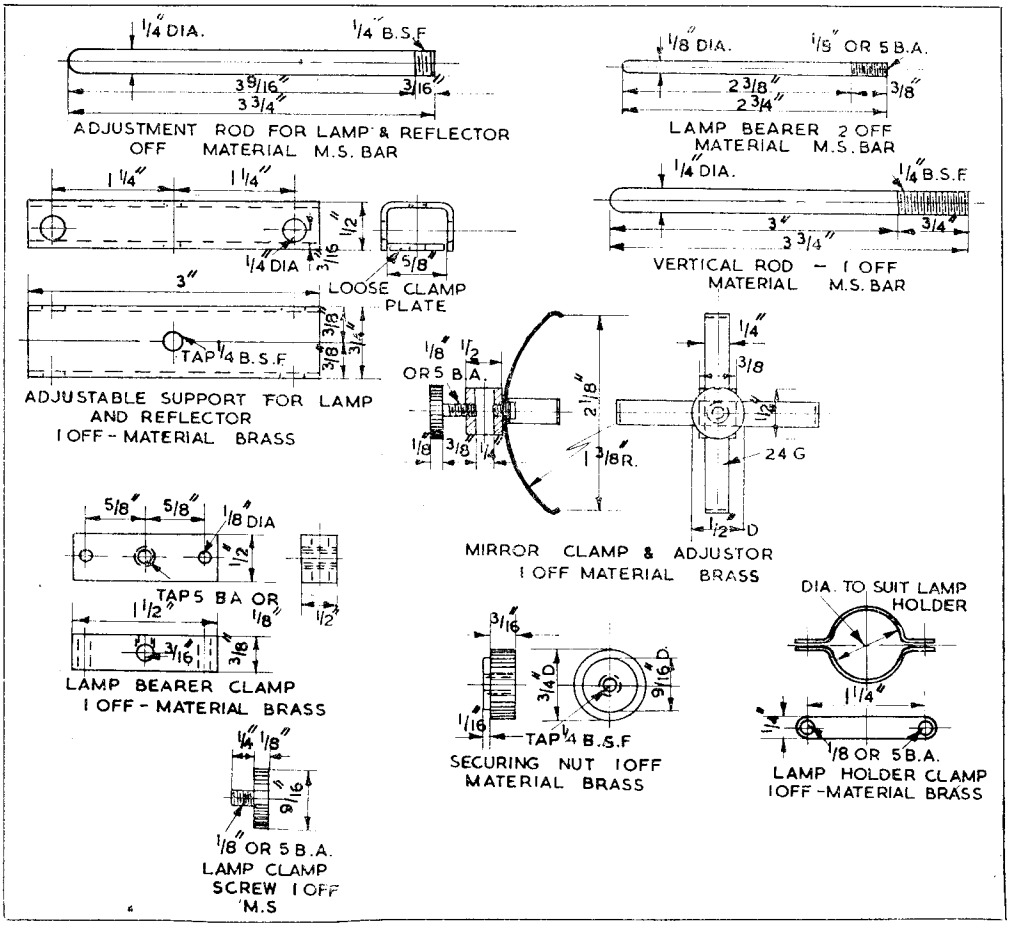
For illuminants much in excess of 100 watts,

*Continued from page 98, "M.E.," July 20, 1950.

some protection of the filmstrip from the effects of radiant heat is desirable, and the simplest method is to use a heat absorption filter. This consists of a screen of special glass, placed somewhere between the lamp and the film; the most convenient position is usually behind the condenser, but in some cases it is located between the condenser elements. The glass

Projection Hints

On the strength of a good deal of practical experience with projectors for lecture and demonstration work, the writer ventures to offer some advice on how to get the best results from any type of projector. It may be said that the general standard of projection, even with quite expensive apparatus, and operators who might



Details of lamp fittings for Universal Miniature Projector

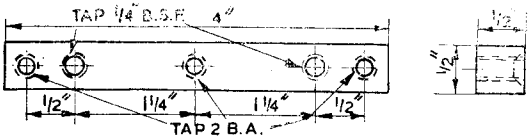
absorbs up to about 50 per cent. of the heat rays; but as these cannot be destroyed without trace, they raise the temperature of the screen and thereby impose heavier duty on the lamphouse ventilation system. It has not been considered necessary to make definite provision for filters in the two projectors described, but there is room to fit them if desired. The special glass for this purpose is manufactured by Messrs. Chance Bros., of Birmingham, and obtainable from most optical dealers in squares of suitable size. It is slightly tinted, and cuts down illuminating efficiency to some extent, but both these disadvantages must be tolerated if high wattage illuminants have to be used.

reasonably be expected to know better, is very poor. Very often a lecturer who has gone to very great trouble in providing slides or filmstrips of very high quality, is very disconcerted to find them projected out of focus, unevenly illuminated, distorted by careless placing of the lantern or screen, or wrong angle of view relative to the audience. Distracting effects of light leakage, through imperfect blacking-out of windows or lamps, are also common, and can spoil the best lecture.

Illuminant Adjusting

Some operators seem to have only the haziest idea on how to adjust the illuminant in a pro-

jector, though this is a very simple operation which even a child should be able to understand. The common mistake is to try to fix the lamp position before the objective is focussed ; the procedure should be, first to extend the draw tube or objective mount into what is estimated to be the working position, and adjust the lamp roughly so that the illumination is fairly even. Then put a slide (or filmstrip) in position and focus it sharply on the screen ; remove the slide, and complete the adjustment of the lamp so that the screen illumination is perfectly even.



LAMP MOUNTING BLOCK
1 OFF – MATERIAL L. ALLOY

Bar attached to inside of lamphouse to carry lamp fittings

The illustration shows the effects of incorrect light adjustment. To correct a dark patch on the right of the screen, as at *A*, move the lamp to the left, or *vice versa* in the case shown at *B*. A dark patch at the top, as at *C*, indicates that the lamp should be lowered ; at the bottom, as at *D*, that it should be raised. If the corners of the screen are dark, at *E*, the lamp should be moved closer to the condenser ; or if the centre is dark, it should be moved farther away. With an arc lamp or oxhydrogen illumination, it is possible to obtain a perfectly even white screen, but filament lamps often show faint ghosts of the filament which cannot be completely eliminated, though they do not show on the projected picture.

One of the worst evils in projection technique is the craze for the " big picture." It often results in a reduction of brilliance, and the angle at which the picture is viewed by the audience is often too great for comfort, or indeed, for realistic perspective. Always remember that projection efficiency follows the law of inverse squares (" the intensity of illumination varies inversely as the square of the distance ") and the greatest angle which can comfortably be viewed by the human eye is approximately 10 degrees.

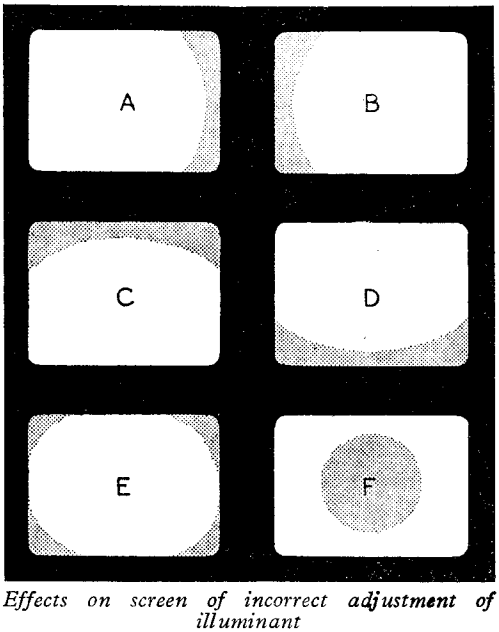
Overflowing Pictures

A still more irritating fault than showing too large a picture is to show one bigger than the available size of screen. One would think that this is too obvious to call for comment, but the writer has often seen pictures overflowing from the screen to such an extent that the lecturer has had to ask for the slide to be moved in order to show some important detail of the picture !

The screen should always be dead flat, and free from creases, spots or blemishes. While the silvered or beaded screen makes the most of the illumination, it is less suited to the projection of " stills " than to moving pictures, and a good plain dead white screen takes a lot of beating. A plain whitewashed plaster wall is quite a good surface—but the writer has often been compelled to use a rough brick wall, imperfectly coated with paint or distemper of any old colour, and this definitely cannot be recommended.

Care should be taken to set the screen exactly square with the axis of the projector, or *vice versa*; it should also be vertical, but if it is elevated well above the eye level of the audience, the projector may be tilted upwards to correspond approximately to the angle of view. Back projection, using a ground glass or tracing paper screen, is definitely an advantage in certain cases, as it gives much improved brilliance of illumination with a given lamp and size of picture ; but it takes up more room than can generally be spared, and the translucent screen is not commonly available.

It is hoped that these common-sense hints will be taken to heart by organisers of lectures ; in model engineering societies, it is all too common for preparations for lectures to be left to an overworked secretary, but it would be a great advantage if one or more committee members were made responsible for such arrangements—and duly jumped on if they fell down on the job. Sometimes nobody thinks of getting the projector and screen ready until all the members are assembled—and then things invariably go wrong, the leads are too short, plug fittings wrong, or it is discovered that there is no power point, and the lamps all work off the same switch. And all the time the bored audience are getting in any frame of mind but the right one for concentrating on the lecture. Remember that the highest compliment which can be paid to the projector or the operator is that nobody was aware of their existence !



Effects on screen of incorrect adjustment of illuminant

*TWIN SISTERS

by J. I. Austen-Walton

Two 5-in. gauge locomotives, exactly alike externally, but very different internally

JUST to keep everyone happy, I include this week a photograph of the sand boxes completed ; this shot was taken before any painting was done, so there has been no fiddling with the finish, nor touching up afterwards. The views do give a very fair idea of the shapes of the boxes, especially the forward pair with the corner shaped to clear the drawhook attachment brackets on the engine—the only reason for the shape given. The degree of " roundness " at the edges is also very distinct, and should help builders to decide just how the finished job should look.

The air inlet cowls on the sand-traps have had their sides filed flat instead of being left at the full half-diameter as described ; this has been done not only to lighten the appearance generally, but to help in clearance matters as well. One builder wrote to say that he anticipated a little trouble on the right-hand, or " six foot " side of the engine, and at the point where the brake-shaft extension comes out for attachment to the crank for the hand brake operating gear. I suggest that builders should fix the sand box position to provide clearance here and to forget about the dimension given on the drawing.

*Continued from page 64, " M.E.," July 13, 1950.

Cylinders

There is nothing like seeing the job " in the flesh " before examining the drawing, and as we cannot do just that, I give a photograph of a more or less completed cylinder unit ; let us detail the main features of interest, so that you will get to know your way round the entire job.

Perhaps the first thing that strikes you is the queer, six-holed plate on the top of the steam-chest. This is in fact a quickly-removable screwed plug or cap, enabling you to inspect the position (for valve timing) and condition of the entire slide-valve. This is so much more convenient than the removal of quite a large number of long studs and nuts, and with the risk of breaking jointing gaskets and washers, and perhaps disturbing the position of the entire steamchest. Not only that, with the short removable section of the running board in place, it is quite invisible and will not spoil the look of the engine.

The steamchest is available in the form of a gunmetal casting (Kennion Bros.) and is quite a clean job. There are end-plates cast on, simulating the actual removable covers found on the prototype, and fitted to facilitate the removal of the slide-valve and rod complete. We have no need to do this, especially with our screwed plug cover, so we put in all the studs shown as dummies,

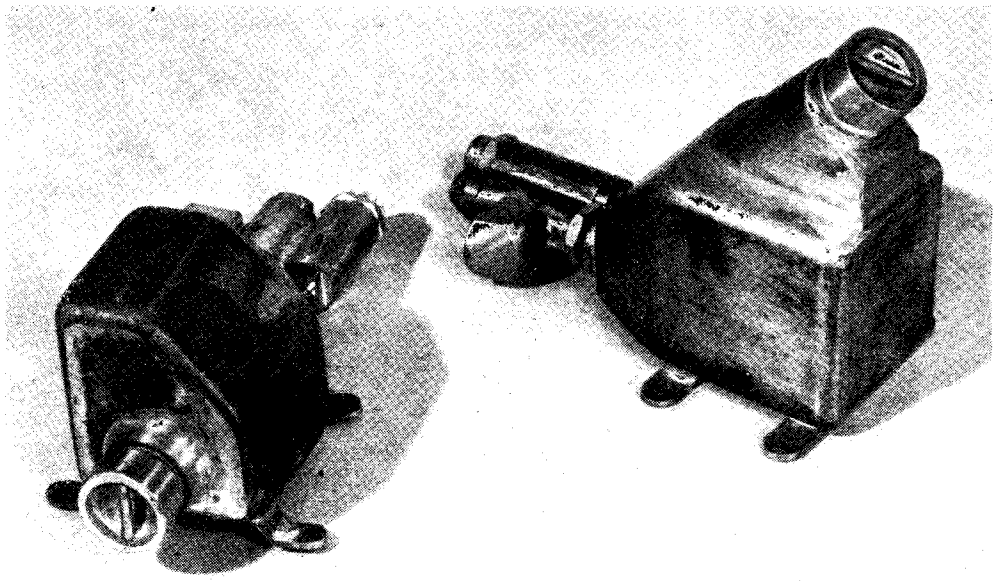


Photo by] [*A. Duncan*

Front and rear sand boxes

which will not have to be disturbed any more.

The chest is held down by nine $\frac{1}{8}$ in. diameter studs, *not* ten as the picture shows, as it was found that one of these fouled the steam entry pipe where it enters at the back. The forward valve-rod guide is a turned part, screwed into a tapped hole, and sweated round with soft solder just as a caulking ; you might want to remove this to replace it at some future time, so soft solder is about the only possible thing to use.

silver-soldered on ; a 6-B.A. set-bolt goes through the other end of the plate, and into the cylinder block, so preventing movement of any kind. This is a very well worth while feature, so do not dodge it.

The pipe flanges are very stout, and made in gunmetal ; the thickness of the flange is 5/32 in., sufficient to prevent that disturbing habit of curling up at the ends, and so preventing a good joint being made. Thin, spidery flanges made from

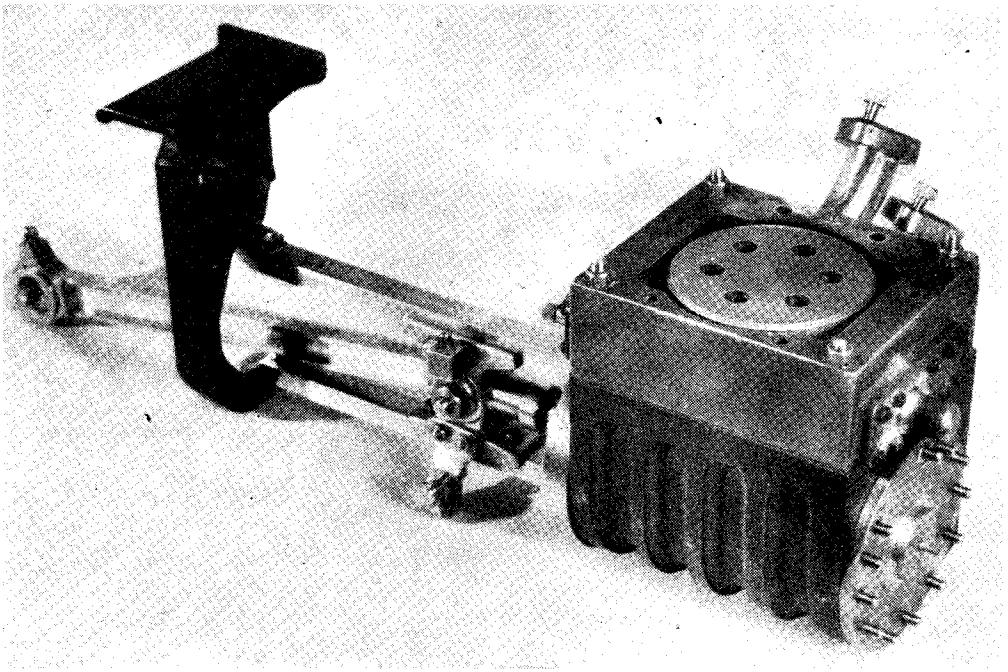


Photo by] [*A. Duncan*

Unit construction

The third picture shows the steamchest off, and with the plug top taken out, whilst by the side is the special spanner made up to form part of the permanent " service kit " for the engine. In this view, the steam pipe is clearly seen, and the unwanted stud hole just above it explains its own redundancy. Once the pipe has been made and set, it is silver-soldered into the steamchest, and gone is the ever-present problem of horrible leaking pipe joints in worse than horribly inaccessible places ; you all know the story of the pipe union that invariably starts to unscrew in the *wrong* place, or the pipe that wants to turn round with the union nut, and comes off second best in the process !

The exhaust pipe is threaded, and screwed into the cylinder block ; *both* pipes are threaded, by the way, the thread being $\frac{7}{16}$ in. by 40 t.p.i., but in this case, silver-soldering is out of the question, even in the case of gunmetal cylinders which might become distorted with the heat. To prevent this pipe turning, and so spoiling the joint, a brass keep-plate is screwed on to the pipe first, and when the pipe position is settled, it is

soft brass are quite useless and utterly unreliable, even for low pressure joints on the exhaust side. These parts are also screwed to the pipes, and later, silver-soldered for permanence and strength.

The pipes themselves are made from $\frac{7}{16}$ in. by 18-gauge copper tube, which leaves an approximate bore of 11/32 in.—something *like* steam ways, and practically dead scale in internal area ; you will not be troubled by engine " wheeze " on this job. You could drop down to $\frac{7}{16}$ in. by 16-gauge pipe ($\frac{5}{16}$ in. bore) if you prefer to work in the stouter gauge of pipe, but with the very simple form of bend required you should have no trouble with either size of tube.

Whilst on the subject of bending large-diameter copper tube, I might as well describe the very simple rig required to do the job ; you can make this up, and have it all ready for the job. From any odd ends of bar, turn up a couple of spools with a semi-circular groove round the edge ; this groove must be truly a half-circle of the outside diameter of the pipe to be bent.

The root diameter of the groove should be 1 in., and the total width of the spool $\frac{9}{16}$ in., or

a little over ; drill a $\frac{3}{8}$ in. hole through the centre for bolting down. These should be fixed to a piece of plate or bar, about $\frac{1}{2}$ in. thick, so that the tube will just pass between the fixed spools—that's all.

That Unit Construction

If you take another look at the second picture, you will see what I mean by unit construction. Here we have the cylinder assembly complete, with motion-plate, guide-bars, crosshead and connecting-rod, all bolted up into a compact piece of mechanism ; there are still a few more parts to add, including the valve-spindle crosshead or guide, the expansion-link and brackets, the combination-lever and the union-link ; but it will still be a complete unit, capable of being removed in its entirety from the frames. The cylinder and steamchest with its two steam pipes are so arranged that the flanges of the pipes will go through the frame aperture without having to disturb the unit. That leaves only the eccentric-rod and the lifting-links to make up.

And now turn to the fourth picture ; this gives a further idea of unit assembly. There is no bending of pipes for the " Y " branches that pick up with the other pipe flanges, only the cutting and joining up of straight pieces of pipe. Notice that each pipe flange has one tapped hole and one clearing hole for the set-bolts ; this is done to make assembly between the frames an easier job. The outside bolts are put in from the top, and the inside ones from the bottom, and all heads are accessible for box-spanner operation.

The tops of the two " Y " branches are joined together by a short, stout plate which not only ensures the branches being put on the right way round, but acts as a sort of spanner, or keep for the other branch. Once again, I would like to point out that conditions inside the average smokebox are far from ideal, and it has been known to find one or both clamping nuts virtually welded on to the pipe with corrosion ; in such circumstances, it is only too easy to twist or even wring off the pipe member underneath it. I think we are going to be free from that particular brand of trouble for all time. But I have not stressed the most important thing of all, which is the wonderfully clear and direct steam passages of ample internal bore, and entirely free from bends or other restrictions, and capable of being put on or taken off with the least amount of time and bother. Personally, I do not think this part of the job is going to give you any trouble at all.

In this same view you will see one of the front covers removed, showing the inside pocket to embrace the nut on the face of the piston, and so enable normal clearances to be held without steam waste pockets. This leaves a projecting

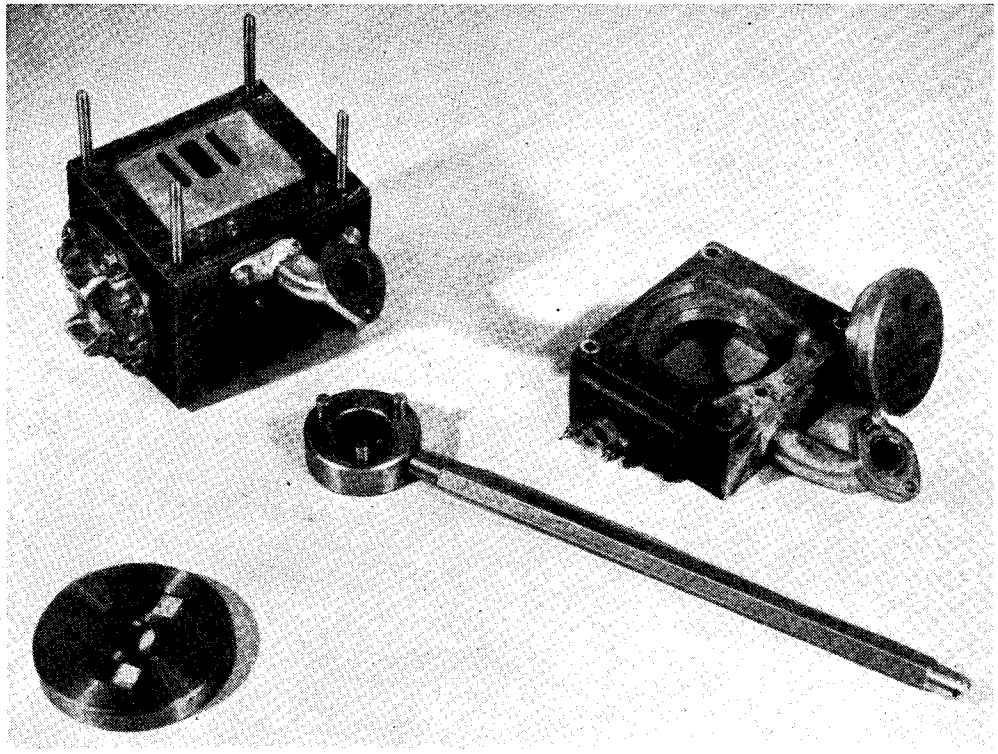


Photo by] [*A. Duncan*

Cylinder, steam chest and special spanner

spigot on the outside of the cover, and to which is fitted a small stud for securing the outer cylinder cover. Although the picture does not show it up very well, you may be able to discern what looks like a fine ridge round the edge of the contact face of the cover, which in fact it is. This is done to prevent any tendency for the gasket to blow out or leak between the fixing studs, and the knife edge bites into the edge of the gasket, from the solid ; it was rather wasteful in material, so I did not feel inclined to release it, especially in the light of current gunmetal prices. However, I hope to have the answer by the time this appears in print, and I know it will not take friend Kennion long to run off the required numbers ; after all, I'm only trying to save your pocket, your machining time, and the suppliers a lot of unnecessary weight to charge and dispatch.

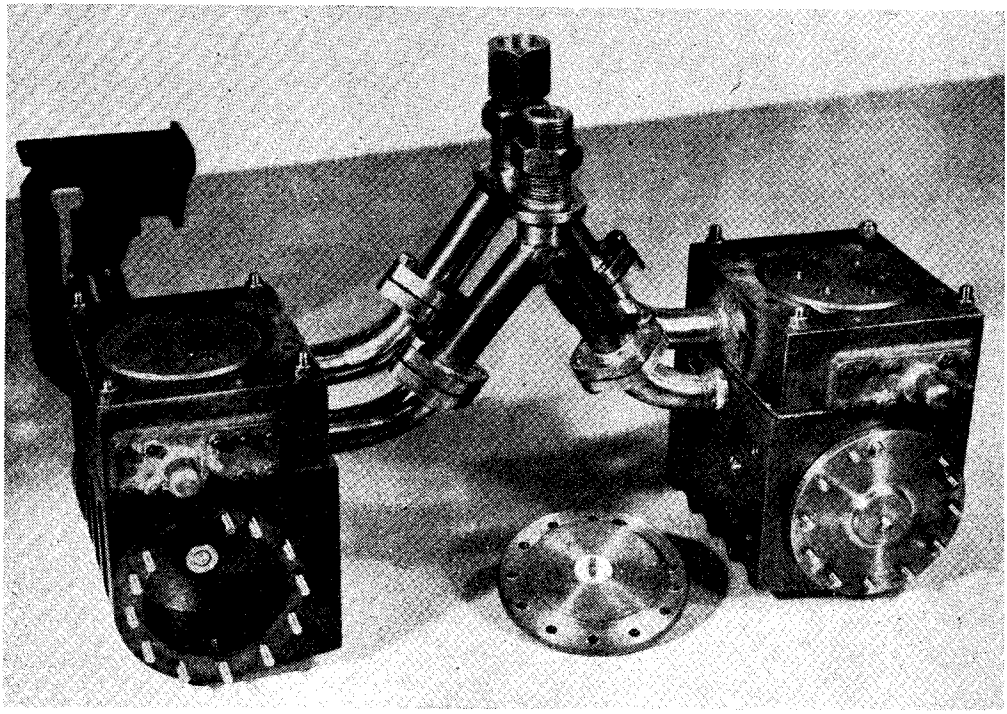


Photo by] [*A. Duncan*

The most important pipework

and also saves excessive pressure being applied to the stud nuts to ensure complete steam tightness—simple to do, and most effective.

Whoa ! There, Boys

You have had enough picture gallery for one week—this was supposed to be my ration for a whole month, so unless I can find a nice quiet turning job for Duncan, I'm afraid I am sunk.

Let us turn our attention to some more serious aspects of making cylinders and suchlike, and to the bits of gear likely to be needed on the job.

First of all, castings ; these are all available with the exception of the back cylinder covers, and I have been trying out a number of things, including a certain amount of fabrication.

I wanted to devise some way of making a cover with very accurate lugs for the attachment of the guide-bars, so that, when the crosshead was made it would mate up with the bars in a truly central position. The first cover was a casting so devised that the lugs could be machined

You could also order up a quantity of $\frac{1}{8}$ in. diameter stainless rod—Firth's E.M.S. for preference ; a slight excess will not come amiss, as you will be bound to need this same material for other studs later on. The pipe flanges could also be small castings, although they are not yet listed as such. Slide-valves could be made from bar material, 1 in. by $\frac{1}{2}$ in. in $\frac{7}{8}$ in. lengths, for short-ported cylinders or $1\frac{1}{8}$ in. lengths for long ports. Pistons would be from bar material, $1\frac{1}{4}$ in. diameter or a little over, centrifugally cast-iron rod being an ideal material for use with cast-iron or Meehanite cylinders. Piston-rods, $\frac{1}{4}$ in. diameter stainless, valve rods $\frac{5}{16}$ in. diameter.

The copper tube we have dealt with, and might be $\frac{7}{16}$ in. diameter by either 16- or 18-gauge. Some small quantity of hexagon brass bar, $\frac{5}{8}$ in. across the flats, to make the nuts and main steam pipe union, whilst the remaining parts would either be from short ends of gunmetal or bronze bar, or out of the scrap-box. All the gasket material is 1/32 in. thick " Hallite."

(*Continued on page* 196)

*A Radio-Controlled Model "DUKW"

by G. C. Chapman and P. A. Cummins

THE engine control is carried out in a similar manner, using a two-way ratchet switch of Post Office type. The control lever at the transmitter operates a pulsing device similar to that used for steering, but with five discreet positions. Movement of the lever from any position to the next transmits one pulse of a signal frequency appropriate to the direction of movement. The corresponding relay in the model steps the selector switch, which is, therefore, made to follow the movements of the control lever. The switch wipers control the speed and direction of the main drive motors. The five positions are : half speed astern, off, half speed ahead, full speed ahead, and full speed ahead with propellers. The switch connections are shown in Fig. 4. To facilitate lining up the engine control switch with the position of the lever, a cut-out button is provided on the control panel which paralyses both engine channels.

The fifth channel is used to sound the horn from a simple push-button, which operates the corresponding relay in the receiver.

The "DUKW" on its road trials

The radio transmitting equipment consists of four units, which are interconnected by means of flexible cables and non-interchangeable plugs and sockets. Only a few minutes are required to put it into operation. The transmitter itself with the aerial array mounted permanently on it, is set up on a camera tripod. The connecting cable plugs into the audio oscillator unit, which itself is connected to the control unit and power pack. Two power packs have been constructed, one using a 12-V accumulator as a primary source of power, and the other designed to work from 230 V, a.c. mains. Each provides similar outputs, and plugs into the oscillator unit *via* the same cable. The total power consumption of the transmitting gear is approximately 100 W, although only 4.5 W are fed into the radio frequency oscillator, which complies in every respect with G.P.O. regulations. Figs. 5 and 6 show the circuits of the transmitter.

The receiving equipment in the model consists of three units : a radio frequency receiver, a filter and relay unit, and a power pack. A super regenerative detector working at 465 megacycles feeds the combined output from all channels to a high gain amplifier stabilised by

*Continued from page 145, "M.E.," July 27, 1950.

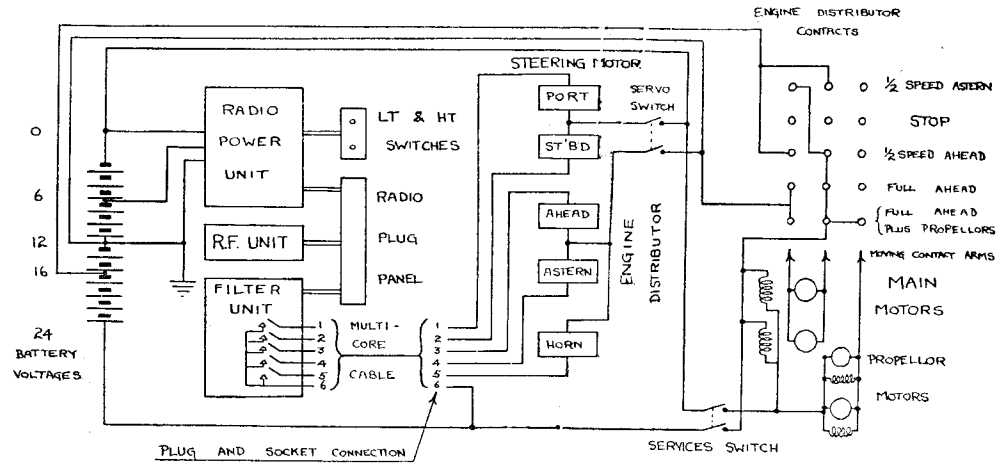


Fig. 4. Wiring diagram of servos and services

negative feedback (*See* Fig. 7). The amplified signal is then passed to the filter unit which extracts the individual signals and feeds them at a suitable voltage level to the relay circuits (Fig. 8). The channel frequencies used are: 2.5, 3.0, 3.6, 4.7 and 5.8 kilocycles per second, and the filter selectivity such that no interference occurs between channels with any possible combination in use. The relays themselves are not highly sensitive, as a current swing of 7 mA is available in each channel. They are set to operate at about 1.5 mA, the current in the "off" condition being a few microamps, so that high pulsing speeds are possible. In this particular model the relays and the steering motor ratchets reach their limiting stepping speeds at about the same point, namely 30 impulses per second.

The receiver power pack contains a motor-generator delivering up to 50 mA at 250 V, and operating from one 12-V section of the 24-V battery which provides the whole of the power in the model. The power consumption with the model under way, and with all controls in operation is approximately 72 W, giving an average discharge current in the battery of 3 A.

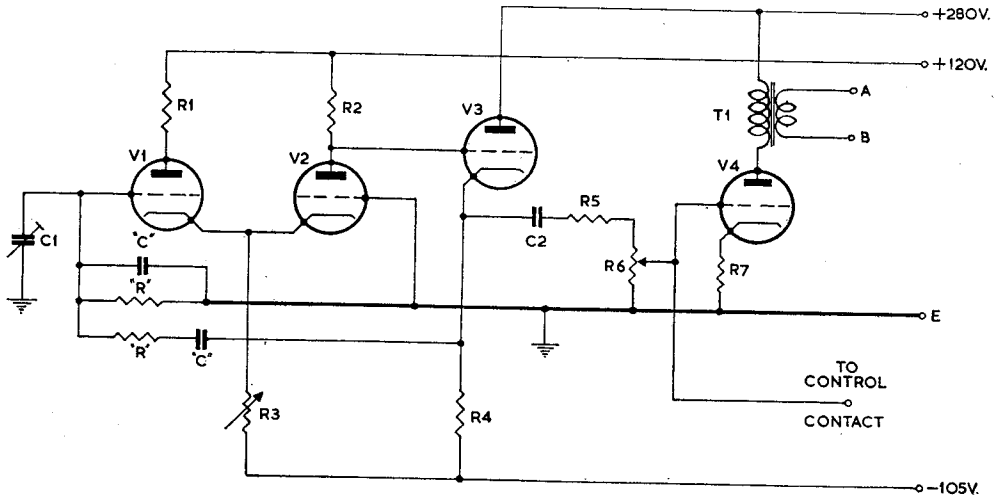
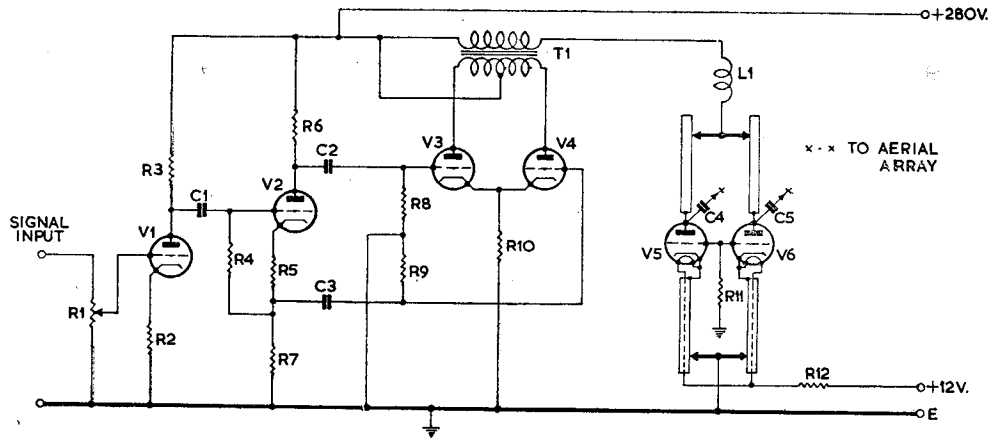


Fig. 5. Oscillator and buffer

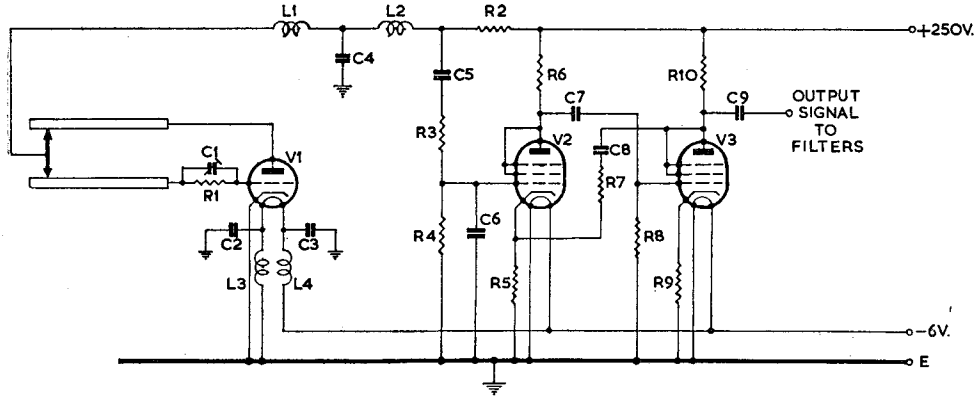


R1 - 1M. R5 - 1K. R9 - .47M. C1 - .01μf. V1,V2 - 6SN7GT. T1 - 1 : 1 CLASS B DRIVER.
R2 - 1K. R6 - 22K. R10 - 470Ω. C2 - .01μf. V3,V4 - 6SN7GT. L1 - R.F.C.
R3 - 47K. R7 - 22K. R11 - 10K. C3 - .01μf. V5 - EC53. 5T. 1/4" DIA.
R4 - 1M. R8 - .47M. R12 - 15Ω. C4 - 20 pf. V6 - EC53.
C5 - 20 pf.

Fig. 6. Modulator and transmitter

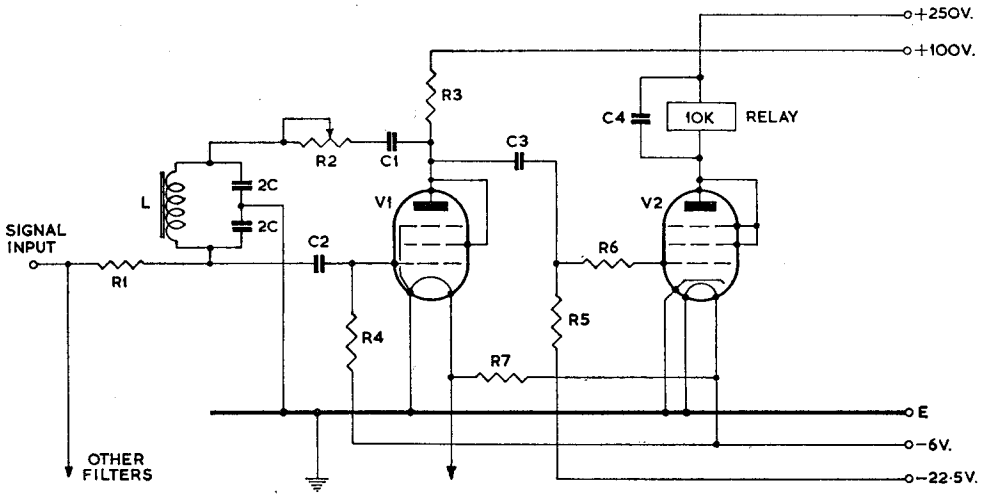
At this rate the length of run available is just under one hour.

A few notes on the driving of the DUKW may be of some interest. The remote control of a vehicle with a system capable of the degree of precision obtainable with this equipment, presents some quite unique experiences. When the model is travelling directly away from the operator it is quite simple to avoid obstacles and make the desired course, once the ratio of steering wheel movement to model deviation has been learned. This is about the same as in a normal motor vehicle, namely two and a half turns of the wheel from one full lock to the other. Having allowed the model to travel a convenient distance and brought it around through 180 deg., a quite different state of affairs exists. The normal instinctive corrections to avoid obstacles now have the opposite effect, and by the time this is discovered it is usually too late to avoid a mishap. Since at normal speeds there is just not time to think of what movement to make, a new set of instincts has to be acquired, and quite a few hours' "driving" is necessary before the correct movement can be made *every time* irrespective of the position of the model relative to the



R1 - 1M. R6 - 10K. C1 - 5pf. C6 - 47pf. V1 - 955 L1
R2 - 10K. R7 - 47K. C2 - Special. C7 - .001μf. V2 - 6F12 L2 } V.H.F. CHOKES.
R3 - .1M. R8 - .47M. C3 - do. C8 - .1μf V3 - 6F12 L3
R4 - .47M. R9 - 220Ω. C4 - .001μf. C9 - .01μf. L4
R5 - 220Ω. R10 - 10K. C5 - .005μf.

Fig. 7. Detector and amplifier



R1 - ·22M. R3 - 47K R5 - ·47M. R7 - 10Ω V1 - 3S4. V2 - 6AK5
R2 - ·5M. R4 - 1M. R6 - ·47M. L,C - TO SUIT FREQUENCY.
C1 - ·05μf. C2 - ·005μf. C3 - ·01μf. C4 - ·1μf.

Fig. 8. *Filter and relay*

operator. It is also very difficult to judge clearances on each side of the vehicle when it is some distance away and travelling across the line of sight. No amount of practice will obviate this difficulty, and it is necessary to wait until the "last moment" before making the required correction.

Another point which has to be watched is that the DUKW has no brakes, and the amount of "overrun" after stopping engines has to be learned and allowed for. In case of emergency it is possible to reverse engines just before stopping, but this throws a considerable strain on the main drives.

During the series of demonstrations given at the "Model Engineer" exhibition no faults occurred in the electronic part of the system, and only very minor ones in the mechanism, which could be easily corrected in the course of routine adjustments. On one occasion a lead to the main switch controlling the engine selector came off, and left the "driver" with no apparent means of stopping the vehicle other than waiting for the batteries to run down!

Twin Sisters

(*Continued from page* 192)

Tools and Equipment

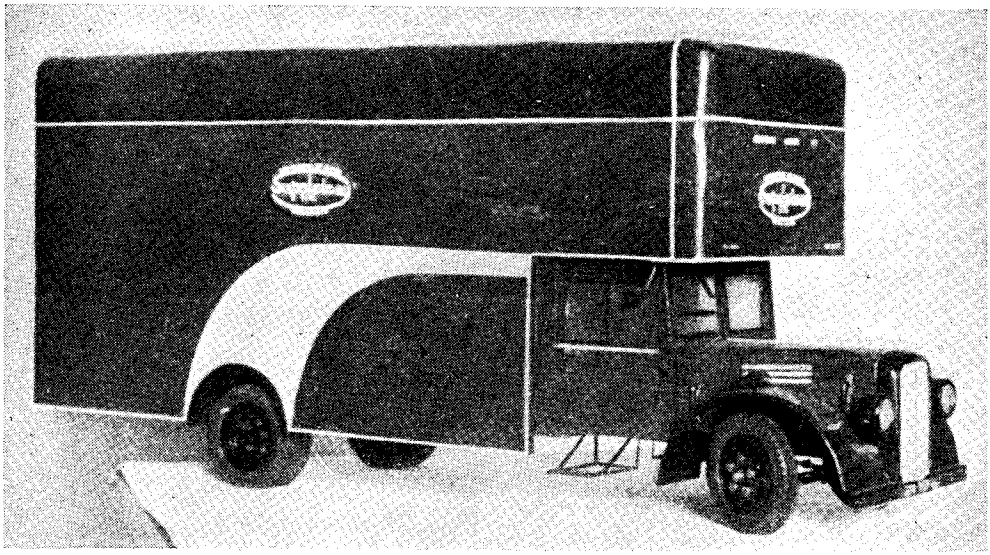
The major machining operation is, of course, on the cylinder itself. Those people who are fortunate enough to possess a "Keats" angle-plate, and a faceplate big enough and *strong enough* to swing it without excessive whip or overhang, will have no worries at all. Next to this comes the faceplate and angle-plate set-up, but with most of the same conditions as to stiffness still prevailing. I propose to deal with a number of cylinder boring methods, so that builders can choose one best suited to their own particular conditions and likes (and ability); so altogether, we ought to get the cylinders bored in a satisfactory manner.

Screwing tackle will include a $\frac{7}{16}$ in. × 40 t.p.i. die and taps, 3- and 5-B.A. taps and dies, and a pair of 26 hand-chasers—one inside and one outside. The latter are not absolutely necessary for the job; but as you will have to screw-cut the inspection plug and steamchest, they will enable you to comb out the threads to a really respectable and well fitting finish.

The remaining thread problem will be with the main connections shown on the top of the "Y" branches. These have a $\frac{1}{2}$ in. major diameter, and, although I like the 26 thread series very much for this class of work, any other fine thread would do equally as well.

One great advantage of keeping to a standard number of t.p.i., lies in one's ability to set up the lathe change-wheels, and to screw-cut all the threaded parts for pipes and unions regardless of diameter. Sometimes I cut the thread roughly, using a die to finish the work to size, and on larger work—a hand-chaser.

(*To be continued*)



A Model Furniture Delivery Van

FURNITURE delivery is my job and this van is a model of a Dodge owned by my firm before the war.

It is built as near as possible to the scale of ½ in. to 1 ft., and has taken about two years' spare time to construct.

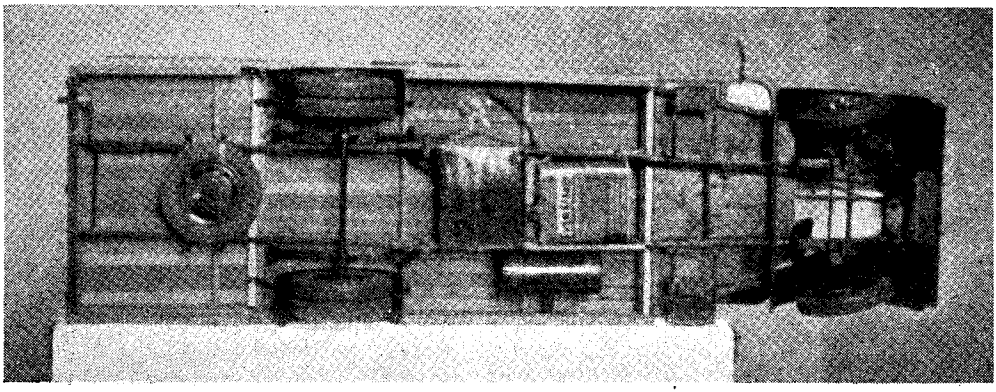
The bodywork was tackled first, and is correctly framed, the floor and overhead luton being separately planked. For panelling I used thin cardboard, and the beading is banjo fret-wire.

Next, the cab was built up. The floor and rear engine cover are of tin, and the rest of cedarwood from an old cigar-box. The doors have sliding windows, chrome door handles, and leather strap-stops. The driving-seat and backrests are covered in rexine and stuffed with kapok. The dashboard is fitted with dummy ignition and light switches, and the speedometer is a second dial from an old wrist-watch.

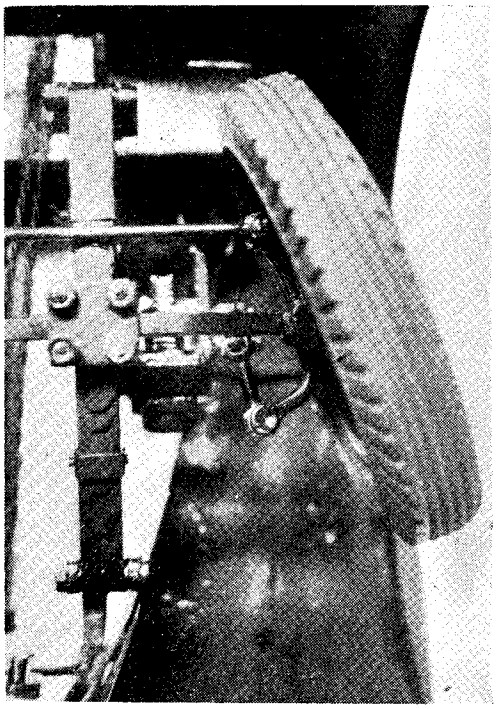
A solid block of balsa was used for the radiator with more strips of fret-wire glued and pressed in to represent the grille.

Bonnet cover and sides are all in one piece, and are held down by four small links from an expanding wrist-watch strap.

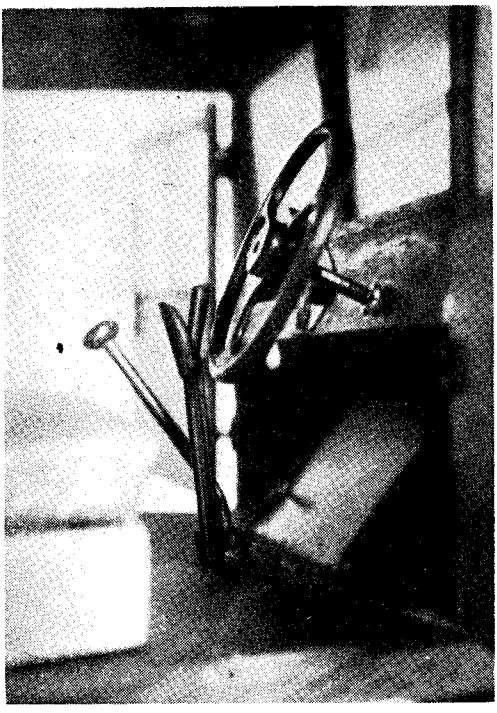
The chassis members are brass curtain runners ; and road springs are cut from an old gramophone spring—U-bolts made out of bicycle spokes.



A view of the model van from underneath



Front offside wheel, spring and steering gear



Inside the driver's cab

Steering is operated through a small worm and wheel.

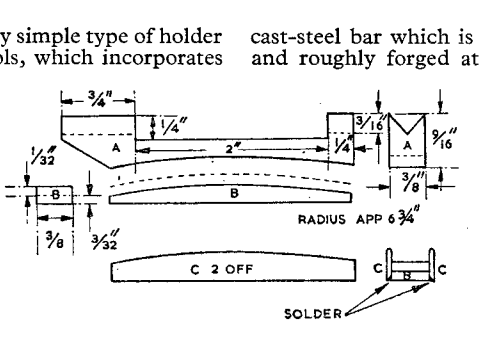
Wheels are turned out of gunmetal, and their machining took many hours of treadling on my Super Adept lathe. They bolt on to dummy brake drums which are studded 6 B.A.

The lights are 4½-volt pea-bulbs fed from two flashlamp batteries carried between the chassis members. A small switch mounted underneath the body gives either " all lights " or " side and tail only."

The finish is blue and cream, with black mudguards and running gear ; and was sprayed by means of a foot-pump and an " Em-Dee " sprayer with a discarded aspirin bottle for a cellulose container.—D. McNEIL.

A Simple Height-adjusting Toolholder

The drawings show a very simple type of holder for round section lathe tools, which incorporates the well-known rocker principle of height adjustment. The component *A* may be fabricated or cut from the solid and is vee-grooved along the top to carry the tool, the under surface being filed concave to fit the rocker *B*, which has cheek-plates *C* attached by soldering and brazing to keep the parts *A* and *B* in alignment. The tools used in this holder are made from unfinished ¼-in. round cast-steel bar which is first cut into 4 in. lengths and roughly forged at one end. These can be shaped by filing or grinding to suit requirements before hardening and tempering. A dozen or more tools of this type can be made for a few shillings, and are very suitable for small work.



If made to the dimensions given in the sketches herewith, the height from the tool-post surface to the lathe centres is approximately 0.65 in.

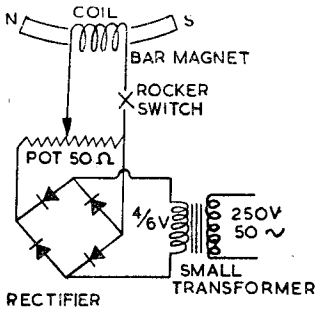
—C. TURNBULL.

PRACTICAL LETTERS

Electric Clock Contacts

DEAR SIR,—I read with interest a letter by H. G. Bickerdyke on the above subject, and thought a description of my efforts with a "Tempex" (Bulle type) clock may be of interest.

As you already know, the pendulum bob on these clocks is a coil which swings along a bent magnet, and receives impulses on each swing from a battery contained in the base, contact being made through a rocker switch actuated by a peg on the pendulum-rod. Battery voltage is 1.5 V, and with modern cells, the life of which may be six months or six weeks, no reliability could be placed in the clock. I therefore constructed a small rectifier of only four units taken from a copper-oxide rectifier, connected as a bridge, current being supplied by a small bell transformer. These, together with a 50-ohm potentiometer, were assembled in the base. The



potentiometer spindle was slotted to take a small screwdriver and so mounted that adjustment could be made, through a small hole at the base front.

Rough pendulum adjustment was then made and the fine timing on the "pot". No radio interference is caused to a large radio only 5 ft. away, and no condensers are used. The arrangement has been in use now for 10 months, and except for two mains cuts has been completely satisfactory. No sparking occurs. I do not know if this system would work with other types of electric clock, but it is worth trying. The "pot" is essential for two reasons—fine regulation and current control.

Yours faithfully,

Northwich. ERIC I. R. BELLAS.

Safety Measures for Model Steam Engines

DEAR SIR,—About two years before the second World War, there were a number of accidents, in various parts of the country with model steam engines. There was, for instance a very bad case of scalding, due to the explosion of a model stationary steam engine, in the village near here, so *at that time*, I devised a method whereby it would be practically impossible to have an explosion, and yet drive any model size steam engine.

It was merely powdered bicarbonate of soda (ordinary washing soda will do) and powdered tartaric acid. Mix with fingers, and fill any ordinary cycle or motor cycle acetylene lamp type of generator, and pipe to model engine. When the water drip is turned on, it will drive the model steam engine the same as with compressed air, with carbonic acid gas in reality, which is odourless, invisible, etc. The very small acetylene, *cycle*-size, generators can be fitted inside model railway engine tender tanks, and easier still under the superstructure in model steam boats.

This method runs the models for a longer period than with an ordinary filling of a model size steam boiler.

As there are probably very many model societies scattered all over the world whose members would like to know of this safety method, the only way, therefore, to let them know of it is through the pages of THE MODEL ENGINEER.

Yours faithfully,

Colchester. SYD. W. UPJOHN.

Model Car News

DEAR SIR,—May I offer a word of constructive comment or query on the subject of the contents of "ours," especially with reference to the issue published on the third week of each month.

Do you really consider that model car makers are in sufficient numbers to justify their being given eight pages of articles, especially in view of the two to three pages weekly devoted to that subject ?

I am not a model car enthusiast and may consequently be biased, but I would like to know what other readers think.

Yours faithfully,

Sheffield. W. JENKINS.

Re Query Reply No. 9813, July 6th, 1950

DEAR SIR,—From the details given in this query it would appear that the motor is a "Delco Remy" arranged for capacitor starting. The pin and strip with two legs function as follows: the strip and two legs balance the pin and sliding disc. The disc should have a leather washer as part of its construction and is held down towards the shaft by a spring. When the rotor is up to speed the disc moves upwards on its pin. At rest, the disc lies upon the banjo (skillet) which is the switch in the starting winding, when in this position the circuit is complete: when up to speed, the disc leaves the skillet and in so doing opens the starting winding, leaving the motor running on its running winding. The condenser is in series with the starting winding and this switch; this circuit in turn is connected in parallel to the running winding. There are three terminals, but one is a dummy. Usually the two terminals, one above the other, are the main terminal; the remaining terminal is an accom-

modation terminal specially used in the circuit of the refrigerator for which this motor is designed. You would not use this terminal in your case. Nothing would appear to be missing on the starting gear as you describe, because you say the pin and washer are intact and also the skillet. If, however, any parts are missing, you should contact the Frigidaire Refrigerator people who would be able to supply the necessary parts.

These motors are not generally available on the normal market. It is noted that the rotor comprises a series of holes and it is taken that these holes carry the usual copper bars and end rings ; if the bars and rings are missing it will be necessary to provide same before the motor could be made to run.

Yours faithfully,
Enfield. J. W. COOPER.

CLUB ANNOUNCEMENTS

Malden and District Society of Model Engineers Ltd.

On August 13th from 11 a.m., the South Eastern Association of Model Engineers will be holding a locomotive gala day at the Malden Society's track, Claygate Lane, Thames Ditton. Visitors welcomed. Refreshments will be available.

Hon. Secretary : G. C. SMITH, 101, Tudor Drive, Kingston, Surrey.

The Ossett and District Miniature Car Club

The opening meeting of the year took place on a recent Sunday before a crowd of approximately 1,500 people. The following clubs were represented : Derby, Sunderland, Guiseley, Bradford, Harrogate, Bolton, Nottingham, Altrincham and Comet M.C.C.

Owing to the large number of entries it was decided that each competitor should have one run only. This took the form of a flying ¼-mile run, and a nomination race, the idea being that each competitor nominates the speed he hopes to equal on his timed ¼-mile, the winner to receive the Ossett Presentation Cup.

Nomination Race Winner : W. Reeks, of Altrincham. Nominated speed 45 m.p.h., actual speed 45.45 m.p.h.

Results :—

" C " Class

		Club	Speed
1st	J. S. Oliver	Nottingham	65.22
2nd	J. S. Oliver	Nottingham	62.5
3rd	K. Proctor	Sunderland	49.44

" B " Class

		Club	Speed
1st	Mrs. Moore	Derby	88.24
2nd	E. Arnstay	Sunderland	84.1
3rd	B. Winterburn	Guiseley	83.88

" A " Class

		Club	Speed
1st	G. E. Jackson	Derby	108.43
2nd	Mrs. K. Shaw	Ossett	107.14
3rd	A. Randall	Derby	102.85

Prizes were given to first and second in each class. Mr. J. S. Oliver asked that the second prize be given to K. Proctor as runner-up in the 2½-c.c. event.

Track records were broken in the 2½-c.c. and 5-c.c. classes Records are now as follows :—

" A " Class : K. Shaw, 109.71 m.p.h. ; " B " Class : Mrs. Moore, 88.24 m.p.h. ; " C " Class : J. S. Oliver, 65.22 m.p.h.

Hon. Secretary : B. WALKER, 15, Thorpe Avenue, Thorpe, nr.W akefield, Yorks.

Eccles Model Engineering Society

On Sunday, July 9th, 23 members paid a visit to the railway works at Crewe and a very enjoyable visit it proved to be, as well as a test of endurance (the works cover an area of 136¼ acres and I think we walked over every foot of it). All sections of locomotive building were inspected and much valuable information was acquired, especially by members who are building locomotives.

Track days will be held on the following dates :—August 6th and 20th, September 3rd and 17th, on our track in Winton Park. We welcome visitors and their locomotives any time to our track which is considered by many to be one of the finest continuous tracks in the north. It will be made available to visitors any time if they will just drop a line to the secretary. A No. 66 bus from Manchester (fare 4½d.) will put them down within 200 yards of the actual track.

Hon. Secretary : F. R. BAXTER, 44, Leamington Road, Winton, Patricroft, Manchester.

City of Leeds Society of Model and Experimental Engineers

A party of 29 members and friends, including a contingent from the Harrogate society, paid a most instructive and enjoyable visit on Saturday, July 8th, to the British Railways locomotive works at Doncaster.

No meetings will be held at Salem Chapel in August, the next being on Tuesday, September 5th, at 7.15 p.m.

Hon. Secretary : R. G. COLBRAN, 9, Church Wood Avenue, Leeds, 6.

The Model Power Boat Association

The M.P.B.A. Grand Regatta will be held on Sunday, August 20th, at the boating lake, Victoria Park, London. E. The regatta will commence at 11 a.m. sharp, and intending competitors are asked to co-operate by arriving early due to the heavy programme. The events will be run in the following order :—

1.—Nomination race.
2.—" C " Class (restricted) for E.D. Trophy.
3.—" B " Class for Mears Trophy.
4.—" C " Class for the Victory Cup.
5.—Steering competition for M.P.B.A. Steering Cup.
6.—" A " Class Speed Championship Cup.
7.—Prototype competition for Prototype Cup.
8.—Crebbin Trophy for fastest flash steamer.

Attention is drawn to Rule 5 of Competition Rules concerning registration numbers on boats. Temporary marking may be used if it is not convenient to make them permanent.

Hon. Secretary : J. H. BENSON, 25, St. Johns Road, Sidcup, Kent. Tel. : Footscray 7428.

The Coventry Model Engineering Society

A very pleasant evening was spent at a recent meeting when a member, Mr. L. Ellis, gave a lecture on the subject of " Railway Signalling."

Work is now in progress on the laying of a permanent track at the Memorial Park, and meetings are being held there every Friday evening for track-laying. The track is being assembled in the cellar of the B.T.H. Social Club, Holyhead Road, this work being done on Wednesday evenings.

All members are reminded that any help they can give will be welcome.

Hon. Secretary : W. J. DEAN, 52, Morris Avenue, Wyken, Coventry.

The Lewes and District Model Engineering Club

The future programme of the above club is :—

August 10th. A visit to Falmes pumping station. (Meet at gates 6.30 p.m.)

August 24th. Track construction.

September 7th. A practical demonstration of aircraft engines by Mr. Cyster.

September 21st. Track construction and committee meeting.

October 5th. A talk on the construction of a 5-in. gauge Halton tank engine by Mr. W. M. Hebblethwaite.

October 19th. Track construction.

The radio section meets in the clubroom at Southover Grange every Friday at 7.30 p.m.

Hon. Secretary : C. H. E. MOORE, 6, Lewes Road, Ridgewood, Uckfield, Sussex.